

Class TELEOSTOMI

Subclass ACTINOPTERYGII

Fishes with skeleton of true bone. Gill opening single with gill cover, the operculum. Skull usually hyostylic. Branchial lamellae supported by a double row of branchial ribs. Radials of paired fins not biserial. Air bladder generally present. Otoliths solid. No spiracle. Scales generally present but sometimes modified into ossified dermal plates or a complete bony covering.

1. Asymmetrical body with both eyes on one side of head Order PLEURONECTIFORMES
Bilaterally symmetrical body with an eye on each side of head 2
2. Ventrals present (sometimes reduced or absent, in which case the snout is produced and the body is encased in bony rings 3
Ventrals absent 25
3. Ventrals abdominal or sub-abdominal 4
Ventrals thoracic or jugular 12
4. Body encased in bony plates or rings; snout tubular Order SYNGNATHIFORMES
Body with normal overlapping scales; snout not tubular 5
5. One dorsal fin 6
Two distinct dorsal fins 10
6. Gill membranes broadly united with isthmus; jaws edentulous Order CYPRINIFORMES
Gill membranes free from isthmus; jaws usually toothed 7
7. Lateral line when present, situated in upper half of sides and not forming a raised ridge 8
Lateral line low on sides; forming a slightly raised ridge 9
8. Head scaly and depressed; ventrals fairly large Order CYPRINODONTIFORMES
Head naked; ventrals small Order CLUPEIFORMES
9. Long tapering tail; 8-13 rays in ventrals .. Order HALOSAURIFORMES
Tail forked, truncate or rounded; 6 rays in ventrals Order BELONIFORMES
10. No spines in first dorsal; adipose dorsal fin present Order SCOPELIFORMES
Only spines in first dorsal; second dorsal soft rayed 11
11. Lower rays of pectoral free and filamentous Order POLYNEMIFORMES
No free filamentous rays in pectoral Order MUGILIFORMES
12. Ventrals with 1 spine and 5 rays 13
Ventrals not with 1 spine and 5 rays 19

13. First dorsal modified into an adhesive disc with transverse laminae on top of head Order ECHENEIFORMES
 First dorsal normal 14
14. Pectorals large and in two parts Order DACTYLOPTERIFORMES
 Pectorals moderate and normal 15
15. Anal fin with 1-4 spines; first vertebra attached to skull
 Order ZEIFORMES
 Anal fin not forming separate anterior spinous part; first vertebra not attached to skull 16
16. Second dorsal and anal fins followed by finlets
 Order PERCIFORMES (SCOMBROIDEI)
 No free finlets behind dorsal and anal (except when lateral scutes are present) 17
17. Spiny projections on head; a bony ridge on cheek
 Order PERCIFORMES (COTTOIDEI)
 No prominent spiny projections on head; no ridge on cheek 18
18. Ventrals close together or fused forming a cup-like disc
 Order PERCIFORMES (GOBIOIDEI)
 Ventrals separate Order PERCIFORMES (PERCOIDEI)
19. Spines present in fins 20
 No true spines in fins 24
20. Scales present 21
 Scales obsolete 23
21. Scales large and strongly ctenoid or serrated; head with mucous canals
 Order BERYCIFORMES
 Scales small and smooth; no mucous canals on head 22
22. Anal with 2 or 3 spines; ventrals with 1 spine
 Order PERCIFORMES (ACANTHUROIDEI)
 Anal with 7 spines; ventrals with 2 spines
 Order PERCIFORMES (SIGANOIDEI)
23. Anterior dorsal spines modified to a movable illicium with fringes or filaments; ventrals with 6 rays Order LOPHIIFORMES
 Anterior dorsal spines not modified; ventrals with 1-4 rays and sometimes a small concealed spine .. Order PERCIFORMES (BLENNIOIDEI)
24. Two dorsal fins; first with 1 or 2 ossified rays
 Order MACROURIFORMES
 A single dorsal fin consisting of only rays
 Order PERCIFORMES (OPHIDIOIDEI)
25. Body extremely long; eel-like or ribbon-like 26
 Body short; not eel-like or ribbon-like 27

26. Body flattened and ribbon-like Order PERCIFORMES (TRICHIUROIDEI)
 Body cylindrical and snake-like Order ANGUILLIFORMES
27. Scales modified into denticles, needle-like or body encased in bony plates
 Order TETRAODONTIFORMES
28. Scales when present are normal overlapping type 28
28. Large sub-cylindrical body; upper jaw prolonged into a stout beak
 Order PERCIFORMES (SCOMBROIDEI, part)
- Oblong to ovate body; upper jaw not prolonged; ventrals rudimentary or
 disappear with age Order PERCIFORMES (STROMATEOIDEI)

Order CLUPEIFORMES

No spines in dorsal and anal fins. Scales well developed, cycloid. Ventral fins generally small, sometimes absent. Caudal fin homocercal. Vertebral centra pierced by a foramen. Upper jaw bordered by premaxillaries and maxillaries. Weberian apparatus absent. Generally physostomous.

1. Teeth generally large. Photophores present along lower side of head, trunk and tail 2
 Teeth generally not large. Photophores absent 5
2. Dorsal fin between pectoral and ventral fins, its first ray filamentous
 CHAULIODONTIDAE
- Dorsal fin behind the ventral fins, its first ray not filamentous 3
3. Dorsal and anal fins close to caudal fin; no adipose dorsal fin
 STOMIATIDAE
- Dorsal fin median in position; adipose fin usually present 4
4. Teeth large. Dorsal origin behind middle of length, opposite to anal
 GONOSTOMIDAE
- Teeth fine. Dorsal origin in middle of length, situated before anal
 MAUROLICIDAE
5. Lateral line present 6
 No lateral line 8
6. No teeth. 4 branchiostegals CHANIDAE
 Teeth present. More than 4 branchiostegals 7
7. Anal far behind dorsal. 14-16 branchiostegals ALBULIDAE
 Anal opposite to dorsal. Less than 9 branchiostegals
 ALEPOCEPHALIDAE
8. No abdominal scutes DUSSUMIERIIDAE
 Keeled abdominal scutes present 9
9. Mouth large, snout prominent. Gill membranes somewhat united. Maxillary very long ENGRAULIDAE
 Mouth not large, jaws equal. Gill membranes separate CLUPEIDAE

Family ALBULIDAE

Body elongate. Snout bluntly conical. Mouth inferior. Teeth minute, present on intermaxillary, mandibulary, vomer and palatines. Eye with adipose eyelid. Axillary scales present above and below pectorals and ventrals. A single dorsal fin before ventrals; anal short, far behind vent. Scales cycloid; lateral line almost straight. Gill membranes separate, not united with isthmus.

24. *Albula vulpes* (Linnaeus)

Esox vulpes Linnaeus, Syst. Nat. ed. 10, 4, p. 313, 1758.

Albula conorhynchus Day, Fishes of India, p. 648, 1878.

Albula vulpes Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 7 fig. 5, 1913. Smith, Fishes of Southern Africa, p. 85, fig. 99, 1949. Munro, Fishes of Ceylon, p. 23, pl. 6, fig. 54, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 646, fig. 2, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 2, 1969 (Cat. No. CMFRI-LA-F. 19/19).

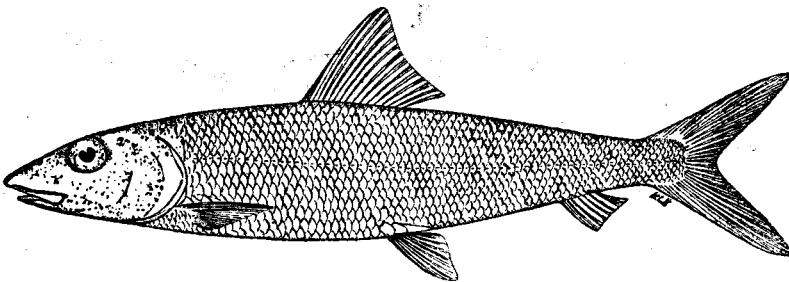


FIG. 24. *Albula vulpes* (Linnaeus), 153 mm.

Specimens studied: Bangaram (5), 124 to 138 mm. Minicoy (8), 65 to 153 mm.

D. 16-18; A. 8-9; P. 17-18; V. 9-10. Ll. 68-76; Ltr. 8+11-12.

Body sub-cylindrical and tapering at both ends. Head 3.5-3.7 in standard length, 4.4-4.7 in total length. Depth of body 4.6-5.0 in standard length, 5.7-6.2 in total length. Eye with broad adipose eyelids, 4.3-4.7 in head, 1.5-1.7 in snout and 1.1-1.3 in interorbital space. Snout conical, prominent and overhanging the mouth. Dorsal insertion midway between tip of snout and base of caudal or slightly nearer to the former. Origin of ventral below posterior rays of dorsal. Anal fin near caudal and far behind vent. Colour: Olive to yellowish; belly silvery. Fins yellowish white; tip of caudal lobes often slightly dusky.

Local names: *Miemas* (Minicoy). *Elimeen* (Bangaram).

Distribution: Pantropical.

Family CHANIDAE

Oblong, moderately compressed. Mouth small; jaws edentulous. Ventrals with a symphyseal tubercle fitting into a notch of the intermaxillary bone. Dorsal fin opposite to ventrals. Ventrals with 11-12 rays. Gill membranes free from isthmus. Numerous fine gill rakers. Scales small, cycloid. Line straight. Dorsal and anal with a low scaly sheath.

25. *Chanos chanos* (Forskål)

Mugil chanos Forskål, Descript. Animal., p. 74, 1775.

Chanos chanos Weber and de Beaufort, Fishes of Indo-Australian Archipelago, 2, fig. 8, 1913. Smith, Fishes of Southern Africa, p. 88, fig. 105, 1949. Munro, Fishes of Ceylon, p. 34, pl. 6, fig. 95, 1955. Jones, Bull. cent. mar. Fish. Res. I, p. 3, (Cat. No. CMFRI-LA-F. 17/28).

Chanos salmoneus Day, Fishes of India, p. 651, pl. 166, fig. 2, 1878.

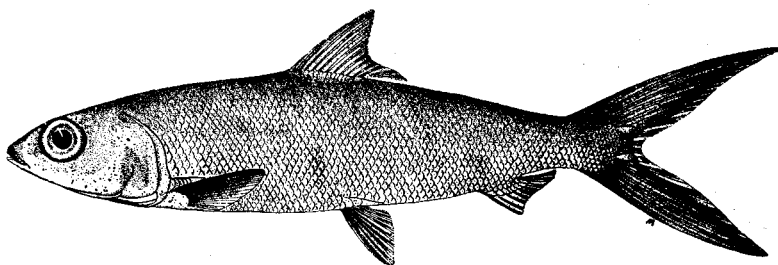


FIG. 25. *Chanos chanos* (Forskål), 210 mm.

Specimens studied: Minicoy (2), 130 and 210 mm.

D. 14; A. 10; P. 16; V. 11. Ll. 76-77; Ltr. 12 + 1 + 15 - 16.

Head 3.2-3.4 in standard length, 3.9-4.7 in total length. Depth of body 4.0-4.5 in standard length, 5.4-5.6 in total length. Eye subcutaneous, 3.0 in head, about 0.7 in snout and 1.2 in interorbital space. No gular plate or teeth. Head naked. Axillary scales present above and below pectorals and ventrals. Maxillaries broad without supplemental bone. Mandibles with a symphyseal tubercle. Dorsal origin midway between tip of snout and base of caudal. Ventrals below hind half of dorsal. Colour: Greenish grey above, sides and bottom silvery. Dorsal, caudal and anterior rays of anal and inside of pectorals and ventrals dark.

Local name: *Mekkunu* (Minicoy).

Distribution: Widespread from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Philippines, Japan, Hawaiian Islands, south to New South Wales and New Zealand and east as far as the coast of Mexico.

Family CHANIDAE

Oblong, moderately compressed. Mouth small; jaws edentulous. Mandibles with a symphyseal tubercle fitting into a notch of the intermaxillaries. Dorsal fin opposite to ventrals. Ventrals with 11-12 rays. Gill membranes united and free from isthmus. Numerous fine gill rakers. Scales small, cycloid. Lateral line straight. Dorsal and anal with a low scaly sheath.

25. *Chanos chanos* (Forsk.)

Mugil chanos Forsk., Descript. Animal., p. 74, 1775.

Chanos chanos Weber and de Beaufort, Fishes of Indo-Australian Archipelago, 2, p. 1, fig. 8, 1913. Smith, Fishes of Southern Africa, p. 88, fig. 105, 1949. Munro, Fishes of Ceylon, p. 34, pl. 6, fig. 95, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., p. 3, (Cat. No. CMFRI-LA-F. 17/28).

Chanos salmoneus Day, Fishes of India, p. 651, pl. 166, fig. 2, 1878.

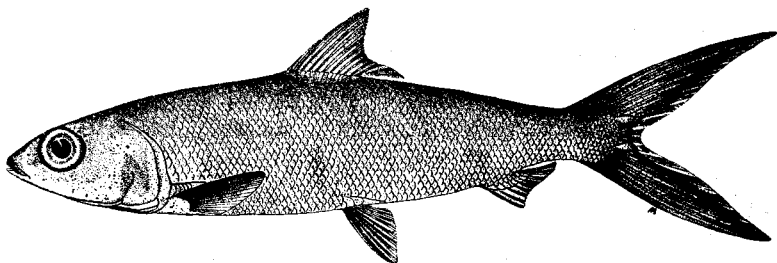


FIG. 25. *Chanos chanos* (Forsk.), 210 mm.

Specimens studied: Minicoy (2), 130 and 210 mm.

D. 14; A. 10; P. 16; V. 11. Ll. 76-77; Ltr. 12 + 1 + 15 - 16.

Head 3.2-3.4 in standard length, 3.9-4.7 in total length. Depth of body 4.0-4.5 in standard length, 5.4-5.6 in total length. Eye subcutaneous, 3.4-3.6 in head, about 0.7 in snout and 1.2 in interorbital space. No gular plate. No teeth. Head naked. Axillary scales present above and below pectorals and ventrals. Maxillaries broad without supplemental bone. Mandibles with a symphyseal tubercle. Dorsal origin midway between tip of snout and base of caudal. Ventrals below hind half of dorsal. Colour: Greenish grey above, sides and below silvery. Dorsal, caudal and anterior rays of anal and inside of pectorals and ventrals dark.

Local name: *Mekkunu* (Minicoy).

Distribution: Widespread from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Philippines, Japan, Hawaiian Islands, south to New South Wales and New Zealand and east as far as the coast of Mexico.

Family *DUSSUMIERIIDAE*

Elongate, belly rounded and without scutes. Mouth small, oblique, bordered by the intermaxillary and the maxillary. Minute teeth in jaws, vomer, palatines, pterygoids and tongue or sometimes wanting. Dorsal inserted opposite ventrals. Gill rakers slender. Scales moderate or large and deciduous.

1. Dorsal origin nearer to caudal than to end of snout. Llat. 51-52. D. 18; A. 16 *Dussumieria hasselti*
Dorsal origin nearer to end of snout than to caudal. Llat. 35-43. D. 11-13; A. 10-14 2
2. Llat. 35-38. D. 11-12; A. 10-11. GR. 13-14+23-26. Bluish black above, silvery on sides and below. Four short blackish lines at base of caudal *Spratelloides delicatulus*
Llat. 40-43. D. 12-13; A. 13-14. GR. 13-15+28-31. Dark bluish above, silvery on sides and below. A silvery lateral band from operculum to base of caudal *Spratelloides japonicus*

26. *Dussumieria hasselti* Bleeker

Dussumieria Hasseltii Bleeker, Nat. Tijds. Ned.-Ind., 1, p. 422, 1850. Day, Fishes of India, p. 647, pl. 166, fig. 5, 1878.

Dussumieria hasselti Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 24/24).

Dussumieria hasseltii Munro, Fishes of Ceylon, p. 29, pl. 5, fig. 77, 1955.

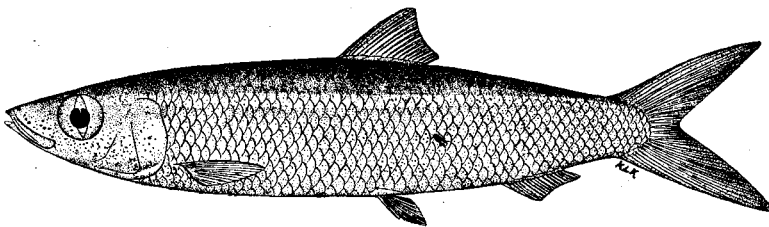


FIG. 26. *Dussumieria hasselti* Bleeker, 100 mm.

Specimens studied: Kavarathi (1), 100 mm. Minicoy (2), 62 and 65 mm. D. 18; A. 16; P. 15. Llat. 51-52; Ltr. 12. GR. 11+1+24.

Dorsal and ventral profile equally convex. Head 3.6-3.7 in standard length, 4.4-4.7 in total length. Depth of body 4.6-6.0 in standard length, 5.7-7.3 in total length. Eye 3.6-4.0 in head, about 1.2 in snout and 0.9 in inter-orbital space. Maxillary reaching nearly to below front margin of eye. Origin of dorsal midway between eye and caudal base. Origin of ventral below first half of dorsal and midway between pectoral base and caudal base. Pectoral equal to or longer than postorbital length of head. Ventral equal to snout. Teeth present on jaws, palatines, pterygoids and tongue. Colour: Bluish green on back, silvery below with a golden lateral band from opercle to base of caudal. Fins hyaline.

Local name: *Feemaru* (Minicoy).

Distribution: Laccadives, coasts of India and Ceylon to Indonesia, Philippines, Taiwan, China and Queensland.

27. *Spratelloides delicatulus* (Bennett)

Clupea delicatula Bennett, Proc. Comm. Zool. Soc., 1, p. 168, 1831.

Spratelloides delicatulus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 20, 1913. Jones, J. Mar. biol. Ass. India, 2, p. 103, 1960. Jones, Proc. Symposium on Scombroid fishes, p. 647, fig. 3, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 24/25).

Stolephorus delicatulus Smith, Fishes of Southern Africa, p. 89, fig. 107, 1949. Smith and Smith, Fishes of Seychelles, p. 8, pl. 4, D, 1963.

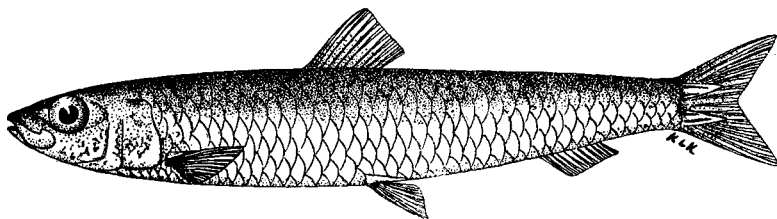


FIG. 27. *Spratelloides delicatulus* (Bennett), 58 mm.

Specimens studied: Agathi (26), 29 to 58 mm. Ameni (5), 41 to 49 mm. Androth (11), 38 to 53 mm. Bitra (44), 33 to 47 mm. Chetlat (14), 38 to 56 mm. Kalpeni (3), 34 to 39 mm. Kavarathi (9), 28 to 53 mm. Minicoy (23), 35 to 56 mm. Suheli (12), 38 to 54 mm.

D. 11-12; A. 10-11; P. 12. Llat. 35-38; Ltr. 7-8. GR. 13-14+23-26.

Head 4.0-4.3 in standard length, 4.8-5.1 in total length. Depth of body 5.0-5.7 in standard length, 6.0-6.7 in total length. Eye 3.5-3.9 in head, 1.0-1.1 in snout and 0.8 in interorbital space. Maxillary reaching behind a level from the front border of eye. Origin of dorsal nearer to snout than to base of caudal. Origin of ventral nearer to origin of anal than to pectoral insertion. Pectoral slightly shorter than snout and eye together. Colour: Bluish black above, becoming lighter and silvery on sides and below. Fins hyaline. Base of caudal with four short longitudinal blackish lines.

Local names: *Hondeli* (Minicoy). *Vayichala*, *Churaichala* (other islands).

Distribution: East coast of Africa to the Laccadives, Indonesia, Philippines and Samoan, Tuamotu and Hawaiian Islands, south to Australia.

Note: In Minicoy this is said to enter the lagoon in large schools and remain there upto about November. During one of the cruises of R. V. *Kalava*, an enormous shoal of this species along with lesser numbers of *S. Japonicus* was seen by us to collect by the ship's side attracted to light while anchored close to the reef on the northeastern side of Bitra. In view of the predilection of tuna for this fish, it is known as "churai-chala" meaning "tuna sardine" in the northern islands. It is a bait-fish of prime importance in any programme of expansion of pole and line fishing for tuna in the Laccadives. It is reported to be the most important bait-fish in the Maldives.

28. *Spratelloides japonicus* (Houttuyn)

Atherina japonica Houttuyn, Verh. Holl. Maatsch. Haarlem, 20, p. 240, 1782.

Spratelloides gracilis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 20, 1913.

Spratelloides japonicus Munro, Fishes of Ceylon, p. 28, pl. 5, fig. 75, 1955. Jones, J. Mar. biol. Ass. India, 2, p. 267, 1960. Jones, Proc. Symposium on Scombroid Fishes, p. 647, fig. 4, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 24/26).

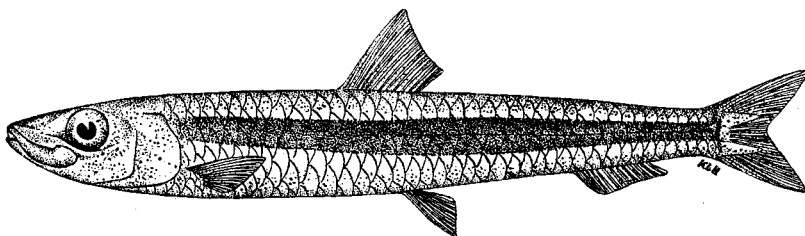


FIG. 28. *Spratelloides japonicus* (Houttuyn), 52 mm.

Specimens studied: Agathi (29), 52 to 57 mm. Ameni (13), 37 to 48 mm. Bitra (5), 41 to 47 mm. Chetlat (17), 42 to 58 mm. Kadamat (7), 51 to 56 mm. Kalpeni (16), 37 to 52 mm. Kavarathi (13), 44 to 54 mm. Kiltan (22), 29 to 54 mm. Minicoy (129), 36 to 60 mm.

D. 12-13; A. 13-14; P. 12. Llat. 40-43; Ltr. 7-8. GR. 13-15+28-31.

Head 4.0-4.3 in standard length, 4.6-5.0 in total length. Depth of body 6.0-6.6 in standard length, 7.0-7.7 in total length. Eye 3.6-4.0 in head, 1.2-1.3 in snout and 0.7 in interorbital space. Maxillary reaching behind a level from the front border of eye. Origin of dorsal nearer to snout than to base of caudal. Origin of ventral nearer to origin of anal than to base of pectoral. Pectoral equal to or slightly shorter than snout and eye together. Colour: Dark bluish on back, silvery white on sides and beneath. A silvery lateral band from operculum to base of caudal. Fins hyaline.

Local names: *Rehi* (Minicoy). *Chala*, *Uri*, *Churaichala*, (other islands).

Distribution: Red Sea, Laccadives and coasts of India and Ceylon to Indonesia, Philippines, Japan, Fiji and Tahiti.

Note: Occurs in great shoals as its congener and is preferred by the islanders as bait fish for pole-and-line fishing for tunas. Its survival rate in the bait basket and bait well appears to be less than that of *S. delicatulus*.

Family CLUPEIDAE

Body fairly elongate and often compressed. Mouth oblique, bordered by the intermaxillary and maxillary. Adipose eyelids sometimes present. Teeth minute or wanting. A single dorsal fin often present. Keeled abdominal scutes present. Gill membranes separate and not united with isthmus. Pseudobranchiae present. Scales moderate or large and thin.

1. Anal fin with more than 40 rays. Ventrals small. 47 scales in lateral series.
30 abdominal scutes 9 of which behind ventrals *Ilisha melastoma*
Less than 20 anal rays. Ventrals moderate. Not more than 45 scales in
lateral series 2
2. Abdomen not strongly compressed, not cultrate. Maxillary not reaching front
border of eye *Sardinella clupeoides*
Abdomen strongly compressed, cultrate 3
3. GR. 16-17+1+38-43. Dorsal origin nearer to caudal than to snout
..... *Sardinella melanura*
GR. 32-35+1+70-76. Dorsal origin somewhat nearer to tip of snout than
to base of caudal *Sardinella fimbriata*

29. *Ilisha melastoma* (Cuvier)

Clupea melastoma Cuvier, Regne Animal., ed. 2, 2, p. 319, 1829.

Ilisha melastoma Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 2, 1969 (Cat. No. CMFRI-LA-F. 25/20).

Pellona dussumieri Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 92, 1913.

Pellona megaloptera Day, Fishes of India, p. 645, pl. 165, fig. 2, 1878.

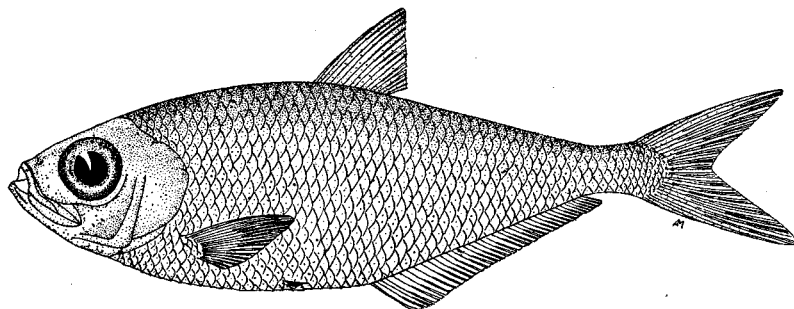


FIG. 29. *Ilisha melastoma* (Cuvier), 107 mm.

Specimen studied: Kalpeni (1), 107 mm.

D. 17; A. 42; P. 16. Llat. 47; Ltr. 14. GR. 9+1+22.

Compressed, abdominal profile slightly more convex than dorsal. Head 3.5 in standard length, 4.4 in total length. Depth of body 3 in standard length, 3.7 in total length. Snout 4.2 in length of head, much shorter than diameter of eye. Maxillary reaching below second third of eye. A ligament between pre-maxillary and maxillary. Small teeth present in jaws, palatines, pterygoids and tongue. Pectoral slightly shorter than head without snout. Base of anal about 2.8 in standard length. Scutes 30 of which 9 are behind ventrals. Origin of dorsal midway between tip of snout and base of caudal. Anal origin below hind rays of dorsal. Origin of ventral midway between pectoral base and origin of anal. Colour: Brownish on back, sides and below silvery white. Fins hyaline; dorsal and caudal with dark border.

Distribution: The Laccadives, coasts of India to Malaysia and Indonesia.

30. *Sardinella clupeioides* (Bleeker)

Amblygaster clupeioides Bleeker, Jour. Indian Archipelago, 3, p. 73, 1849. Munro, Fishes of Ceylon, p. 26, pl. 4, fig. 67, 1955.

Clupea (Amblygaster) clupeioides Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 63, fig. 23, 1913.

Sardinella clupeioides Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 2, 1969 (Cat. No. CMFRI-LA-F. 25/21).

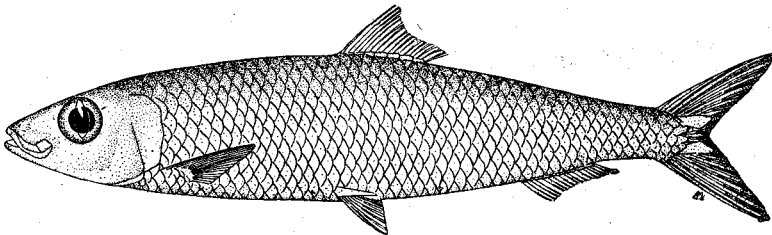


FIG. 30. *Sardinella clupeioides* (Bleeker), 190 mm.

Specimens studied: Agathi (6), 75 to 190 mm. Minicoy (3), 78 to 84 mm.

D. 18-19; A. 17-18; P. 16-17. Llat. 42-44; Ltr. 11-12. GR. 14-16+1+29-32.

Elongate, dorsal and ventral profile nearly equally convex. Head 3.9-4.2 in standard length, 4.7-5.1 in total length. Depth of body 4.3-4.6 in standard length, 5.2-5.6 in total length. Eye 3.4-3.7 in head, slightly shorter than snout and 0.8 in interorbital space. Maxillary not reaching front margin of eye. Teeth present on palatines, pterygoids and tongue. Origin of dorsal midway between

snout and base of caudal. Pectoral slightly shorter than head without snout. Ventral equal to or shorter than postorbital length of head. Ventral below anterior rays of dorsal. Scutes feeble, 16-17 preventral and 13-14 postventral. Predorsal scales 15-17. Colour: Bluish green above, becoming silvery white on sides and beneath. Dorsal and caudal pale greenish, the latter often with dusky posterior margin; other fins hyaline.

Local names: *Gumbala* (Minicoy). *Vayichala* (Agathi).

Distribution: Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Japan.

31. *Sardinella melanura* (Cuvier)

Clupea melanura Cuvier, Regne Animal., ed. 2, 2, p. 318, 1829.

Clupea atricauda Day, Fishes of India, p. 636, pl. 164, fig. 5, 1878.

Clupea (*Harengula*) *atricauda* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 80, 1913.

Sardinella melanura Munro, Fishes of Ceylon, p. 26, pl. 4, fig. 63, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 2, 1969 (Cat. No. CMFRI-LA-F. 25/22).

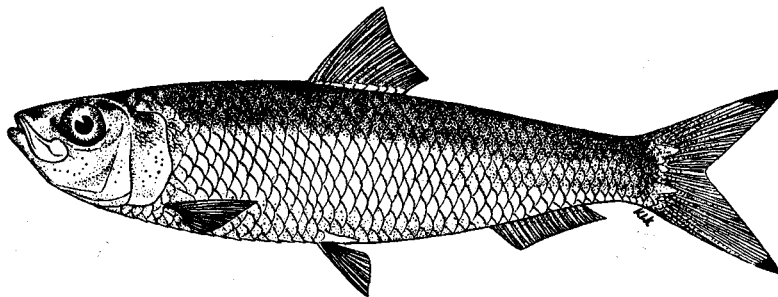


FIG. 31. *Sardinella melanura* (Cuvier), 119 mm.

Specimens studied: Agathi (6), 72 to 119 mm. Ameni (5), 43 to 70 mm. Minicoy (16), 49 to 102 mm.

D. 18-19; A. 17-18; P. 15-16. Llat. 42-44; Ltr. 12. GR. 16-17+1+38-43.

Head 3.6-3.9 in standard length, 4.4-4.9 in total length. Depth of body 3.8-4.0 in standard length, 4.6 to 5.0 in total length. Eye 3.3-3.6 in head, slightly longer than snout and about 0.7 in interorbital space. Maxillary extending to below anterior third of eye. Pectoral equal to or slightly more than snout and eye together. Ventral about half length of head. Dorsal nearer to caudal than to snout. Origin of ventral below or slightly in advance of middle of dorsal. 18-19 preventral and 12-13 postventral scutes. Colour: Bluish green on back,

sides and below silvery white. Fins hyaline, dorsal and caudal slightly dusky; ends of caudal lobes blackish.

Local names: *Machi*, *Gumbola* (Minicoy). *Mathi* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China and Samoan, Society and Bonin Islands.

32. *Sardinella fimbriata* (Valenciennes)

Spratella fimbriata Valenciennes, Hist. Nat. Poissons, 10, p. 359, 1847.

Clupea fimbriata Day, Fishes of India, p. 637, pl. 161, fig. 3, 1878 (in part).

Clupea (*Harengula*) *fimbriata* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 75, fig. 26, 1913 (in part).

Sardinella fimbriata Munro, Fishes of Ceylon, p. 26, pl. 4, fig. 65, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 2, 1969 (Cat. No. CMFRI-LA-F. 25/23).

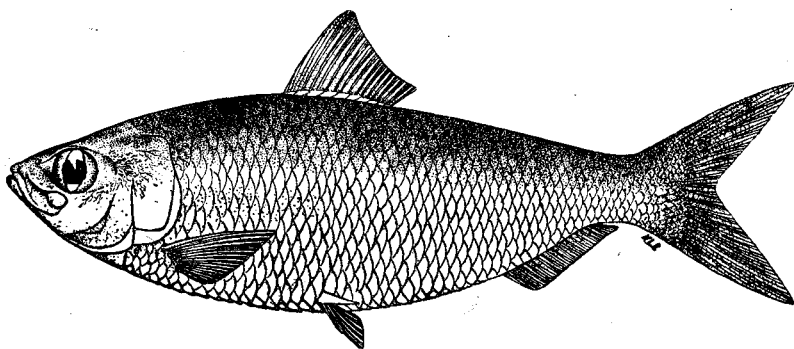


FIG. 32. *Sardinella fimbriata* (Valenciennes), 97 mm.

Specimens studied: Suheli (2), 81 and 97 mm.

D. 19; A. 19; P. 15-16. Llat. 44-45; Ltr. 12. GR. 32-35+1+70-76.

Oblong, compressed, ventral profile more convex than dorsal. Head 3.8-4.0 in standard length, 3.7-5.0 in total length. Depth of body 3.0-3.3 in standard length, 3.8-4.0 in total length. Eye 3.6-3.7 in head, slightly more than snout and about 0.7 in interorbital space. Maxillary reaching to below first third of eye. Dorsal origin nearer to tip of snout than to base of caudal. Origin of ventral in advance of middle of dorsal. Pectoral equal to or slightly shorter than head without snout. 14-15 predorsal scales. Scutes 19 preventral and 14 postventral. Colour: Bluish green on back, silvery on sides and below. Dorsal pale greenish, dusky distally; other fins hyaline, posterior edge of caudal dusky.

Distribution: South Arabia and Zanzibar to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, north to China, eastwards to Society, Fiji, Tonga and Marquesas Islands, south to Australia.

Family ENGRAULIDAE

Body oblong to elongate and somewhat compressed. Snout rounded and overlaps the large mouth, bordered by the intermaxillaries which do not meet in front and by the maxillary having two supplemental bones. A single series of minute teeth in jaws. Minute teeth on vomer, palatines, pterygoids and tongue. Abdominal scutes present. Gill membranes free from isthmus. Pseudobranchiae present. Scales thin and deciduous.

33. *Anchoviella indica* (van Hasselt)

Engraulis indicus van Hasselt, Algemeene Konst en Letterbode, p. 239, 1823. Day, Fishes of India, p. 629, pl. 158, fig. 3, 1878.

Anchoviella indica Munro, Fishes of Ceylon, p. 31, pl. 5, fig. 83, 1955. Smith, Fishes of Southern Africa, p. 94, fig. 118, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 23/27).

Stolephorus indicus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 46, 1913.

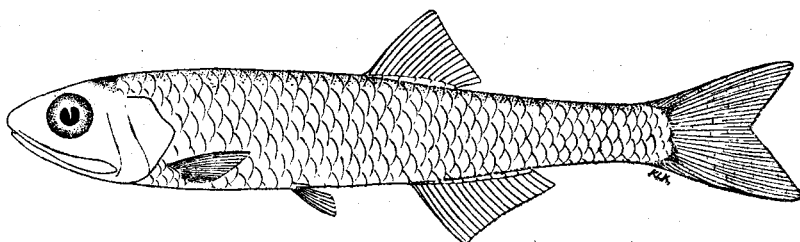


FIG. 33. *Anchoviella indica* (Van Hasselt), 43 mm.

Specimens studied: Minicoy (130), 22 to 43 mm.

D. 16; A. 19-21; P. 15-16; V. 7. Llat. 38-40; Ltr. 8-9.

Head 3.7-4.1 in standard length, 4.6-5.0 in total length. Depth of body 5.0-5.5 in standard length, 6.3-6.7 in total length. Eye 3.4-3.7 in head and 0.7-0.8 in bluntly rounded snout. Snout projecting considerably beyond the jaws. Maxillary reaching to margin of preoperculum. Four or five abdominal scutes between pectorals and ventrals. Dorsal origin somewhat nearer to hind border of eye than to base of caudal. Anal origin below 7th or 8th ray of dorsal, its base 5.2-5.6 in standard length. Pectoral equal to postorbital length of head. Origin of ventral midway between base of pectoral and base of anal. Colour: Back dusky, sides whitish with a silvery lateral stripe. A large dark spot behind occiput. A row of dusky spots above base of anal. Fins hyaline; basal part of caudal dusky.

Distribution: East coast of Africa to the Laccadives, coasts of India and Ceylon, Malaysia, Indonesia, Philippines, north to Taiwan and Japan, and east to Samoa and Tahiti Islands.

Family *ALEPOCEPHALIDAE*

Elongate or oblong, compressed. Mouth moderate or large. Upper jaw formed by premaxillaries and maxillaries. Teeth feeble on premaxillaries, sometimes present on maxillaries, palatines and mandible. Gill membranes overlapping, not attached to isthmus. Pseudobranchiae present. Scales thin, cycloid, sometimes keeled or absent. Dorsal and anal short. No adipose fin. Ventrals situated far back, sometimes absent.

1. Snout produced into a short tube. Body covered with hardly imbricate cycloid scales. About 40 anal rays *Aulostomatomorpha phosphorops*
Snout not produced into a tube. Scales small or large, adherent. Less than 20 anal rays 2
2. Ventrals absent. Body short, compressed. Scales keeled. Humeral arch terminating in an acute, forwardly directed spine *Platytrectes apus*
Ventrals present. Body elongate. Scales not keeled. No humeral spine .. 3
3. Maxillary reaching far behind eye. Snout pointed, longer than eye. D. 15-16;
A. 12. Llat. 68 *Narces erimelas*
Maxillary reaching below middle of eye; snout blunt shorter than eye. D.
17-18; A. 17-18. Llat. about 50 *Bathytroctes squamosus*

34. *Aulostomatomorpha phosphorops* Alcock

Aulostomatomorpha phosphorops Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 307, 1890.
Aulostomatomorpha phosphorops Alcock, Illus. Zool. Investigator, pl. 5, fig. 2, 1892.

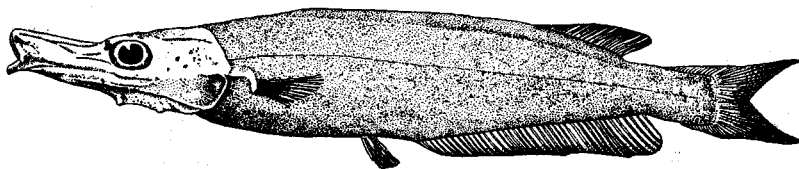


FIG. 34. *Aulostomatomorpha phosphorops* Alcock (after Alcock).

D. 21; A. 41; P. 7; V. 6.

Body elongate and compressed. Head low and rather depressed, 3.2 in standard length. Depth of body 5.4 in standard length. Eye large, slightly more than 5 in head and about 0.5 in interorbital space. Anterior bones of head produced into a long snout ending in a small mouth. Upper jaw slightly projects

beyond the lower. Teeth acute, uniserial and present on premaxillary and mandible only. Gill openings wide, restricted above, its upper edge opposite to upper ray of pectoral. Pseudobranchiae rudimentary. Dorsal origin twice nearer to base of caudal than to gill opening. Anal fin very long, anterior insertion nearer to caudal than to eye. Ventral below middle of body. Caudal forked. Head covered with thick, spongy, glandular skin with snow white reflection which is probably luminous. Body covered with minute, hardly imbricate cycloid scales. Head naked. Lateral line median. Colour: Head excluding eyes snow white; body chocolate, lower part of abdomen darker; fins blackish grey.

Distribution: Laccadive Sea.

35. *Platytroctes apus* Günther

Platytroctes apus Günther, Ann. Mag. Nat. Hist., (5) 2, p. 249, 1878. *Challenger Rep. Deep Sea Fish.*, 22, pl. 58, fig. A, 1887. Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 307, 1890.

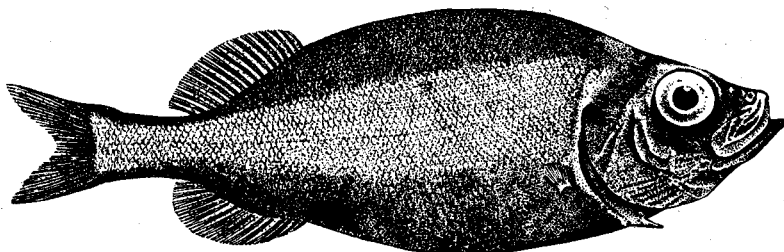


FIG. 35. *Platytroctes apus* Günther (after Günther).

D. 18; A. 17; P. 20. Llat. about 100.

Head and body much compressed and deep. Head 3.3-3.5, depth of body 2.7-2.8, both in standard length. Head longitudinally concave above bordered with a muciferous canal on each side which tapers to a point between nostrils. Eye rather large, close to upper profile, about 3 in head and equal to or slightly more than snout. Lower jaw projecting beyond the upper. Mouth small, maxillary broad and reaching to a vertical from anterior border of eye. Teeth minute, uniserial in jaws; vomer with minute teeth; palatines edentulous. Origin of dorsal in front of a vertical from that of anal. Vent just in front of anal fin. Caudal forked. Pectoral short, slightly longer than half eye diameter. Ventrals absent. Humeral arch terminating in an acute spine. Scales small, cycloid, each with a longitudinal keel. Head naked. Lateral line distinct, almost straight and running along the middle of body. Colour: Brownish; region below pectoral, around vent and upper and lower borders of caudal peduncle black.

Distribution: Central Atlantic and Laccadive Sea.

36. *Narcetes erimelas* Alcock

Narcetes erimelas Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 305, 1890; Alcock, Illus. Zool. Investigator, pl. 4, fig. 1, 1892.

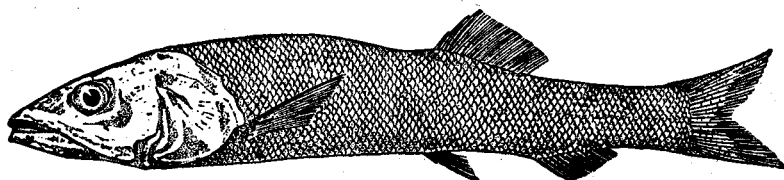


FIG. 36. *Narcetes erimelas* Alcock (after Alcock).

D. 15-16; A. 12; P. 10-11; V. 9. Llat. 68.

Rather elongate and compressed. Head broad, its length 3.2-4.0 in standard length. Depth of body 5.3 in standard length. Eye 5.2 in head and slightly less than concave interorbital space. Head bones sculptured, especially the preoperculum and operculum which have semimembraneous corrugated border. Snout depressed, rounded from side to side and longer than diameter of eye. Mouth wide, maxillary reaching beyond a vertical through hind border of eye. Teeth small, acute, those in jaws not covered by the lips; those in premaxilla and mandible recurved, quadriserial anteriorly and laterally triserial in the former, biserial in the latter; maxillary teeth uniserial; teeth on vomer recurved. Gill openings wide; gill membranes separate. Body with moderately sized deciduous scales. Head naked. Origin of dorsal in vertical through origin of ventrals and nearer to hind border of operculum than to base of caudal. Origin of anal behind a level from the hind end of dorsal. Caudal forked. Pectoral about half length of head. Colour: Head, body and fins almost uniformly black.

Distribution: Laccadive Sea.

37. *Bathytroctes squamosus* Alcock

Bathytroctes squamosus Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 303, 1890. Alcock, Illus. Zool. Investigator, pl. 5, fig. 1, 1892. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 101, 1913.

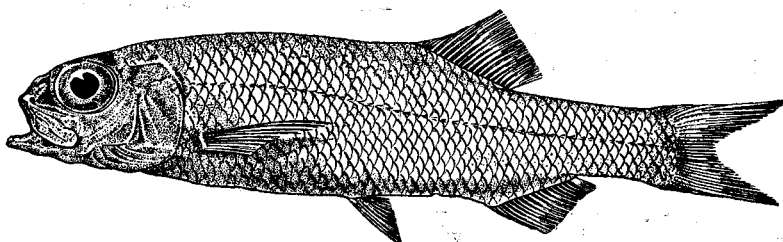


FIG. 37. *Bathytroctes squamosus* Alcock (after Alcock).

D. 17 (18); A. 17 (18); P. 10; V. 9. Llat. about 50; Ltr. 5+1+9.

Body rather elongate and compressed, covered with moderately large scales. Dorsal profile of head slightly convex. Head 3.8 in standard length. Eye very large, 2.8-3.0 in head, 0.6 in snout and about 0.4 in slightly concave interorbital space. Mouth wide; maxillary extending just behind a vertical from middle of eye. A single series of acute teeth in jaws, vomer and palatines. A row of pores along the limb of mandible. Gill openings wide, gill membranes separate. Dorsal origin behind a level from ventrals and nearer to the hind border of operculum than to base of caudal. Origin of anal below a vertical from last ray of dorsal. Pectoral long and narrow, longest rays slightly longer than head without snout. Scales large, deciduous excepting those of lateral line which are adherent and perforated. Colour: Head uniform black, body pinkish brown; fins greyish.

Distribution: Laccadive Sea and Bali Sea.

Family STOMIATIDAE

Body elongate, head short. Mouth large, oblique; teeth in jaws small, those of the intermaxillaries and mandible fang-like. Vomer generally with two fangs, palatines and tongue sometimes with teeth. A long barbel usually present below the chin. Lateral line sometimes present. Luminous organs generally present. Scales present or absent.

38. *Stomias affinis* Günther

Stomias affinis Günther, *Challenger Rep. Deep Sea Fish.*, 22, p. 205, pl. 54, fig. A, 1887.
Stomias elongatus Alcock, *Ann. Mag. Nat. Hist.*, (6) 8, p. 129, 1891. Alcock, *J. Asiat. Soc. Bengal*, 65, p. 333, 1896.



FIG. 38. *Stomias affinis* Günther (after Günther).

D. 17-19; A. 20-21; P. 6; V. 5.

Elongate, strongly compressed with thin, deciduous, hexagonal scales. Head 8-10, depth of body 12-15, both in standard length. Eye 4 in head and equal to interorbital space. Gape of mouth wide, oblique. Mandible projects beyond the upper jaw. Numerous small teeth on maxilla, teeth on intermaxillary large and widely spaced. Vomer with a pair of fangs; teeth on palatines small. Barbel as long as head and trifold at its extremity. Origin of dorsal behind origin

of anal. Anal fin higher than dorsal. Ventrals elongate, extend beyond front anal rays. Pectoral slightly shorter than head. Photophores: 16-17 branchiostegals; ventral series of 9 upto base of pectoral, 42-43 organs between pectoral and ventral; 6 between ventral and anal and 15-16 between origin of anal and caudal; another parallel series of organs below and a third series on midside of body. Colour: Black. Fins white; dorsal, anal and ventrals with black margins.

Distribution: Bathypelagic in Atlantic, Indian and Pacific Oceans.

Family. CHAULIODONTIDAE

Elongate, strongly compressed, head elevated. Mouth large, oblique. Dorsal short, first ray filamentous, situated before ventrals. A short adipose fin present above anal fin. Maxillary with small teeth, intermaxillary with four large fangs; mandibular teeth long, anterior four fangs. A row of teeth on palatines. Luminous organs present on head and in two series above ventral midline of body, the upper row reaching upto vent. Scales hexagonal, easily shed.

23 or more luminous organs between ventrals and anal. Ventral luminous organs not so small *Chauliodus sloani*

20-22 luminous organs between ventrals and anal. Ventral luminous organs and suborbital organ comparatively small *Chauliodus pammelas*

39. *Chauliodus sloani* Bloch and Schneider

Chauliodus sloani Bloch and Schneider, Syst. Ichth., p. 430, 1801. Alcock, Ann. Mag. Nat. Hist., (6) 4, p. 399, 1889. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 110, fig. 38, 1913. Smith, Fishes of Southern Africa, p. 102, pl. 5, fig. 145, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 15/33).

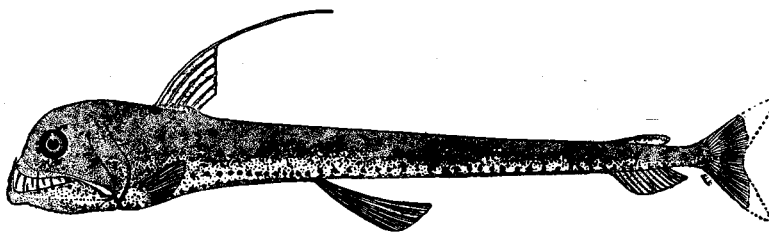


FIG. 39. *Chauliodus sloani* Bloch and Schneider, 20 mm.

Specimen studied: Minicoy (1), 20 mm.
D. 6; A. 12; P. 12; V. 7.

Elongate, strongly compressed. Head deeper than body which tapers evenly to caudal base. Head about 6, depth of body 7, both in standard length. Eye 3.8 in head and less than length of snout. Mouth wide, oblique, maxillary

reaching to preopercle edge. Origin of dorsal behind vertical from the base of pectorals. First dorsal spine produced into a filament. Ventrals almost midway between tip of snout and origin of anal. A short adipose fin present opposite to anal. Jaws with canines, the front four in each jaw excessively long; maxillary with small teeth. A single series of pointed teeth on palatines. Photophores: Two antorbital, a suborbital organ, 14 branchiostegals, 9 between isthmus and pectoral, 21 between pectoral and ventral, 23 between ventral and anal, 11 between anal and caudal, a group of five small organs at base of inframedian caudal rays and a second row of organs from gill opening to above vent. Colour: Brown.

Distribution: Bathypelagic. Tropical Indo-Pacific; tropical and subtropical Atlantic.

40. *Chauliodus pammelas* Alcock

Chauliodus pammelas Alcock, Ann. Mag. Nat. Hist., (6) 10, p. 355, 1892. Alcock, Illus. Zool. Investigator, pl. 30, fig. 4, 1900. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 110, 1913. Norman, John Murray exped., 7, p. 21, 1939.

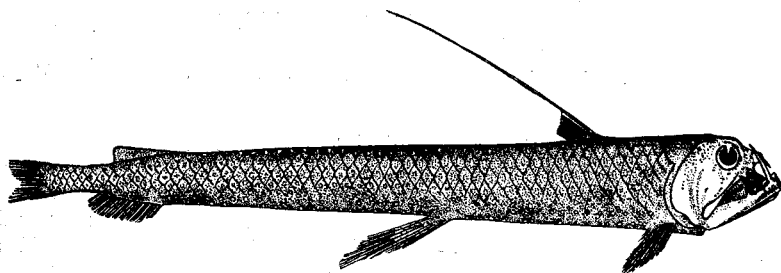


FIG. 40. *Chauliodus pammelas* Alcock (after Alcock).

D. 6; A. 11-12; P. 11-14; V. 7.

Head and body with markedly convex dorsal and ventral profiles. Head about 7 in standard length. Depth of body 7.7 in standard length. Eye about 3.6 in head; snout shorter than eye diameter. Premaxillary with four fang-like teeth on each side; maxillaries with fine teeth. Mandible with a series of widely spaced pointed teeth; 4-8 minute denticles at posterior end of lower jaw. Palatines with a series of small teeth. First spine of dorsal elongate, about 3 in total length. Photophores: A very small suborbital organ; a ventral series of 10 or 11 between isthmus and pectoral; 16-19 between pectoral and ventral; 20-22 between ventral and anal and the upper lateral series of about 50 organs. Colour: Uniform black.

Distribution: Atlantic Ocean, Gulf of Aden, Gulf of Oman, Arabian Sea, Laccadive Sea, Maldivé area and Flores Sea.

Family GONOSTOMIDAE

Body elongate, compressed. Two rows of luminous organs, the upper row incomplete and several organs on head. Mouth very wide; maxillary usually dilated posteriorly. Teeth conical or sometimes fang-like in jaws. Teeth present or absent on vomer. A row of teeth on palatines and pterygoid. Gill membranes not united to isthmus. Pseudobranchiae absent. Scales when present extremely thin and deciduous.

1. Long fang-like teeth in jaws with smaller teeth between them. 30 anal rays *Gonostoma elongatum*
Teeth in jaws small, anterior teeth often caninoid. About 20 anal rays .. 2
2. Colour light with dark markings. Scales absent. Posterior maxillary teeth of almost uniform size. 60-65 teeth of almost equal size on side of mandible *Cyclothone signata*
Colour dark brown. Large, thin deciduous scales. Posterior maxillary teeth about 90, oblique and intermingled with conspicuously longer teeth. About 90 teeth on side of mandible *Cyclothone microdon*

41. *Gonostoma elongatum* Günther

Gonostoma elongatum Günther, Ann. Mag. Nat. Hist., (5) 2, p. 187, 1878. Alcock, Ann. Mag. Nat. Hist., (6) 8, p. 127, 1891. Descript. Cat. Indian Deep-Sea Fishes, p. 139, 1899. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 122, 1913. Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. OMFRI-LA-F. 185/29).

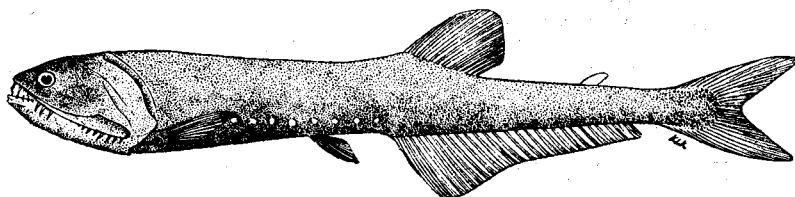


FIG. 41. *Gonostoma elongatum* Günther, 160 mm.

Specimen studied: Laccadive Sea about 100 miles north of Minicoy in plankton haul (1), 160 mm.

D. 14; A. 30; P. 11; V. 8. GR. 8+1+1.

Body elongate and compressed. Head 4.6 in standard length, 5.4 in total length. Depth of body 6.4 in standard length, 7.6 in total length. Eye 7.2 in head, 1.2 in snout and about 1.5 in interorbital space. Gape of mouth oblique, wide. Maxillary nearly reaching to angle of operculum. Lower jaw slightly projecting beyond the upper. Dorsal origin above that of anal, the ante-

rior rays of both fins more than half length of head. Adipose fin nearer to base of caudal than to dorsal. Pectoral about half length of head; ventral shorter than pectoral. 18 large fang-like teeth in upper jaw and 12 fang-like teeth in lower jaw with numerous smaller teeth in between them in both jaws. Palatines with a series of teeth, the anterior gradually larger. No scales. Photophores consisting of a blackish suborbital organ connected with another below; one dorsally at the hind border of preoperculum connected to a glandular yellowish organ; one behind end of maxilla; 9 between branchiostegal rays; 4 between isthmus and pectoral; 11 between pectoral and ventral; 26 between pectoral and caudal, the third one behind origin of anal slightly above the row; one above the base of pectoral and a series of 11 between insertion of pectoral and above origin of anal. A glandular yellowish area at the base of upper caudal rays and 2 similar areas ventrally at the base of lower caudal rays. Colour: Black with silvery lustre. Fins hyaline.

Distribution: East coast of North and Central America, Gulf of Guinea, Laccadive Sea, West of Sumatra, Flores Sea, Banda Sea and Arafura Sea.

42. *Cyclothone signata* Garman

Cyclothone signata Garman, Mem. Mus. Comp. Zool., 24, p. 246, 1899. Brauer, *Valdivia Exped.*, Tiefsee Fische, p. 78, pl. 6, fig. 6 and Text figs. 28 and 29, 1906. Weber and de Beaufort, *Fishes of the Indo-Australian Archipelago*, 2, p. 125, 1913. Smith, *Fishes of Southern Africa*, p. 103, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 185/30).

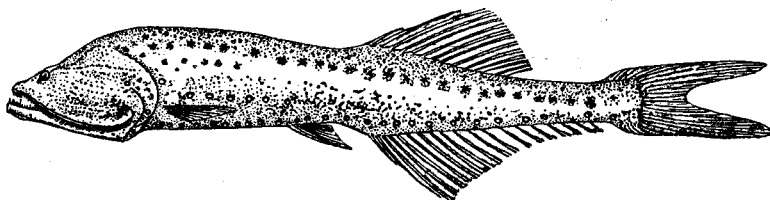


FIG. 42. *Cyclothone signata* Garman (after Brauer).

Specimens studied: 70 miles north of Minicoy, vertical plankton haul from 1000 metres (9), 11 to 20 mm.

D. 12-13; A. 19-20; P. 9; V. 6.

Body elongate and compressed, head conical. Head 4.5-4.8, depth of body 6.5-6.8, both in standard length. Eye 11-12 in head and 1.6-1.8 in snout. Gape of mouth very wide. Lower jaw prominent. Intermaxillary with 6 short teeth. Maxillary with 55-60 teeth of almost equal size. 2 canines and about 10 smaller teeth anteriorly in the mandible followed by a row of 60-65 smaller teeth. Dorsal origin opposite to that of anal. Ventral midway between tip of snout and base of caudal and almost twice nearer to insertion of anal than to

operculum. Vent slightly behind base of ventrals. Photophores: One suborbital organ, 2 at the front edge of preopercle, 8-10 between branchiostegals, a ventral row of 13 between isthmus and ventrals, 3-4 between ventrals and anal and 12-13 between origin of anal and caudal base, a lateral row of 6-7 organs between operculum and above ventral. Colour: Whitish with dark dots on back.

Distribution: Tropical and subtropical Atlantic, Indian and Pacific Oceans.

Note: The specimens available are too small and damaged. The figure is after Brauer (1906).

43. *Cyclothone microdon* (Günther)

Gonostoma microdon Günther, Ann. Mag. Nat. Hist., (5) 2, p. 188, 1878.

Cyclothone microdon Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 126, fig. 46, 1913. Smith, Fishes of Southern Africa, p. 113, fig. 109, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 185/31).

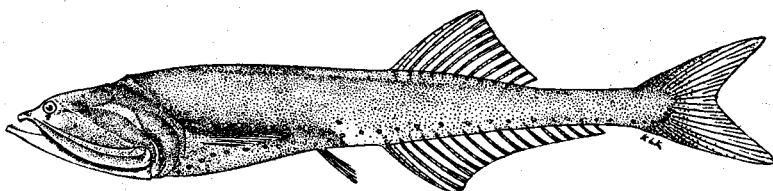


FIG. 43. *Cyclothone microdon* (Günther), 40 mm.

Specimens studied: 70 miles north of Minicoy, vertical plankton haul (5), 17 to 40 mm.

D. 13; A. 19; P. 9; V. 6.

Elongate, compressed, head conical with a slight concavity behind level of eyes. Head 4.7-5.0, depth of body 7.0-7.5, both in standard length. Eye about 12 in head and nearly twice in snout. Mandible slightly prominent. Inter-maxillary with 8 teeth, maxillary with about 90 teeth, the anterior ones vertical, the posterior teeth directed obliquely forward and alternating with some conspicuously longer teeth; mandible with 10-12 teeth anteriorly and a series of about 90 conical teeth. Insertion of dorsal opposite to that of anal and slightly behind centre of body length. Vent slightly behind base of ventrals. Ventral midway between tip of snout and caudal base. Photophores: A suborbital, 2 at the front edge of preopercle, 9 or 10 between branchiostegal rays, a ventral row of 13 between isthmus and ventrals, four or five between ventrals and anal and 15 between origin of anal and caudal base. Upper lateral row of 8-9 organs between hind border of operculum and above ventral. Scales deciduous. Colour: Dark brown.

Distribution: Deep water of most Oceans.

Family MAUROLICIDAE

Moderately compressed, long body. Two rows of luminous organs, the lower row upto the caudal and the upper row between operculum and above vent. Luminous organs present on head. Head conical. Mouth wide, posterior end of maxillary dilated and reaching behind the eye. Dorsal fin single, short situated nearly in the middle of length, its hind rays somewhat opposite to origin of anal. A short adipose fin sometimes present. Teeth small unequal in size. Gill membranes not united and not attached to isthmus. Pseudobranchiae present. Scales thin, easily shed.

44. *Vinciguerria lucetia* (Garman)

Maurolicus lucetius Garman, Mem. Mus. Com. Zool., 24, p. 242, pl. J, fig. 2, 1899.

Vinciguerria lucetia Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 119, 1913. Smith, Fishes of Southern Africa, p. 106, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 186/32).

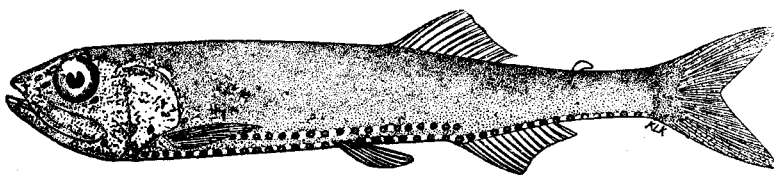


FIG. 44. *Vinciguerria lucetia* (Garman), 38 mm.

Specimen studied: Bitra (1), 38 mm.

D. 13; A. 14; P. 9; V. 7. GR. 7+1+18.

Body elongate, compressed. Head 3.6 in standard length, 4.4 in total length. Depth of body 5.8 in standard length, about 7 in total length. Eye 3.7 in head, equal to pointed snout and about 0.7 in interorbital space. Cleft of mouth oblique, wide, maxillary reaching behind eye. Teeth in a single series in jaws, increasing in size posteriorly. A row of 4-5 teeth on palatines. Scales deciduous. Dorsal origin nearer to base of caudal than to hind margin of eye. Ventral midway between front border of eye and base of caudal and nearer to origin of anal than to insertion of pectoral. Adipose fin above last ray of anal. Photophores consisting of one before eye; one below hind edge of eye; 2 behind preopercle edge and one below; one each side behind symphysis of lower jaw, 8 between branchiostegal rays, a subventral series of 42 from isthmus to caudal base; an upper series of 12 between opercle and ventral and 10 from ventral to above anal origin. Colour: Blackish above, sides silvery. Fins hyaline, caudal dusky distally.

Distribution: Atlantic, Indian and Pacific Oceans.

Order SCOPELIFORMES

No spines in dorsal and anal fins. An adipose fin usually present. Upper jaw bordered by the premaxillaries. Pelvic bones and pectoral radials ossified. Air bladder sometimes present with a pneumatic duct. Pelvic bones not united with the pectoral arch. Scales small or absent.

1. Phosphorescent organs present on head and body MYCTOPHIDAE
No photophores 2
2. Dorsal long and high, originating above hind part of operculum
..... ALEPISAUROIDAE
Dorsal short, its origin above or behind that of ventral 3
3. Upper pectoral rays greatly elongated. Maxilla broad behind
..... BATHYPTEROIDAE
Upper pectoral rays normal. Maxilla narrow SYNODONTIDAE

Family SYNODONTIDAE

Body elongate, cylindrical. Mouth large with numerous canine-like teeth in jaws, the inner series larger and depressible; palatine teeth in one or two rows; teeth present on tongue and gill arches. Dorsal and anal fins short, without spines. A small adipose fin present above the anal fin. Scales fairly large. Lateral line complete.

Teeth on palatines in two bands, an outer elongate band and an inner short band. Teeth in jaws almost exposed. 51-53 scales in lateral line. 4 scales above lateral line to origin of dorsal. Inner pelvic ray not much longer than outer *Saurida gracilis*

Teeth on palatines in a single band. Teeth in jaws notably covered with the lips excepting inner canine-like teeth. 59-62 scales in lateral line. 5 scales above lateral line to origin of dorsal. Inner pelvic ray much longer than outer *Synodus variegatus*

45. *Saurida gracilis* (Quoy and Gaimard)

Saurus gracilis Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 224, 1824.

Saurida gracilis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 143, 1913. Smith, Fishes of Southern Africa, p. 113, 1949. Munro, Fishes of Ceylon, p. 36, pl. 10, fig. 100, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959. Smith and Smith, Fishes of Seychelles, p. 8, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 27/34).

Saurida nebulosa Day, Fishes of India, p. 505, 1878.

Specimens studied: Minicoy (3), 73 to 85 mm.

D. ii, 9; A. ii, 8; P. i, 11; V. i, 8. Ll. 51-53; Ltr. 4+1+6.

Head 3.9-4.1 in standard length, 4.7-4.8 in total length. Depth of body 6.2-6.7 in standard length, 7.5-8.0 in total length. Eye with narrow adipose lid, 5.4-6.2 in head, 1.2-1.3 in snout and equal to slightly concave interorbital space. Teeth in jaws in irregular rows, canine like, unequal, inner series largest

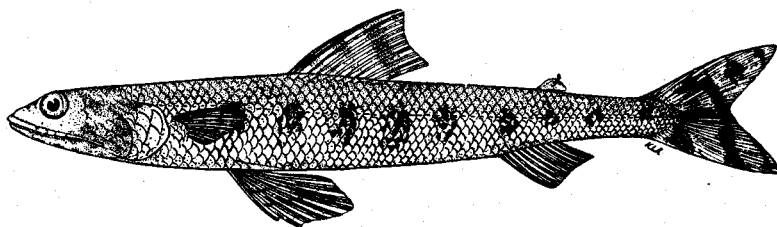


FIG. 45. *Saurida gracilis* (Quoy and Gaimard), 85 mm.

and depressible. Palatine teeth in two bands; outer band longer and in one or two rows, inner band much shorter. Fine teeth on tongue and gill arches. Dorsal inserted midway between tip of snout and base of caudal. Pectoral slightly longer than snout and eye together, reaching 9th or 10th scale of lateral line. Ventral about 2/3 length of snout shorter than head. Colour: Brownish yellow, whitish below with 9-10 irregular dark bars along sides. Dorsal, pectoral and ventral with indistinct bars, caudal lobes with broad dark bars. Anal whitish.

Local name: *Sudung* (Minicoy).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India and Ceylon, Indonesia, Philippines, Ryukyu Islands, New South Wales, eastwards to Hawaiian and Society Islands.

46. *Synodus variegatus* (Lacépède)

Salmo variegatus Lacépède, Hist. Nat. Poissons, 5, p. 157, pl. 3, fig. 3, 1803.

Saurus variegatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 147, fig. 54, 1913.

Synodus variegatus Smith, Fishes of Southern Africa, p. 112, pl. 6, fig. 174, 1949. Smith and Smith, Fishes of Seychelles, p. 8, pl. 4, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 27/35).

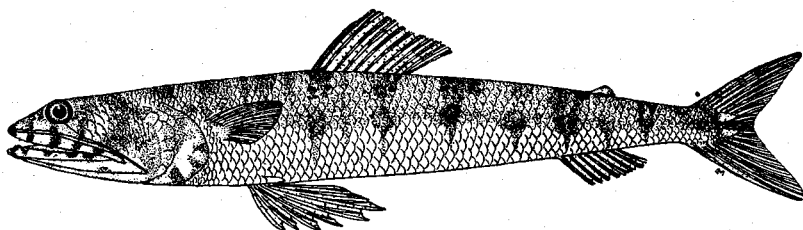


FIG. 46. *Synodus variegatus* (Lacepede), 122 mm.

Specimens studied: Agathi (1), 134 mm. Ameni (1), 122 mm. Kalpeni (2), 75 and 126 mm. Kavarathi (3), 117 to 129 mm. Kiltan (1), 135 mm. Minicoy (4), 52 to 122 mm.

D. ii, 10-11; A. i, 8; P. ii, 11; V. i, 7. Ll. 59-62; Ltr. 5+1+9-10.

Head 3.4-3.7 in standard length, 3.9-4.4 in total length. Depth of body 6.0-6.7 in standard length, 7.0-7.8 in total length. Eye 6.0-7.3 in head, 1.4-1.7 in snout and equal to concave interorbital space. Teeth in jaws in irregular rows, canine like, unequal, depressible and the inner series largest. A narrow band of canine like teeth on palate. Tongue with numerous canine like teeth, short teeth on gill arches. Dorsal origin closer to adipose fin than to tip of snout. Pectoral slightly longer than snout and eye, reaching to 10th or 11th scale of lateral line. Ventral slightly shorter than head. 19-20 predorsal scales. Colour: Greyish to whitish below, head with scattered dark spots, jaws barred with darker; back and sides with 9 dark cross bars, those in front of dorsal, below tip of depressed dorsal fin, just in front of adipose fin and on caudal peduncle darker than others. Dorsal, pectoral and caudal barred.

Local names: *Sudung* (Minicoy). *Valakka* (other islands).

Distribution: Tropical Indo-Pacific from the Red Sea and east coast of Africa to the Laccadives, Andamans, Indonesia, Philippines, north to Ryukyu and Japan, east to Hawaiian, Society and Tuamotu Islands.

Family BATHYPTEROIDAE

Body elongate and compressed, head depressed. Cleft of mouth wide. Teeth in narrow bands in jaws; a patch of teeth on each side of vomer; palatines edentulous. Dorsal moderate, its origin above or behind that of ventral. A small adipose fin usually present. Some of the upper pectoral rays greatly elongate, separated from the rest of the fin. Outer ventral rays prolonged. Caudal deeply forked, sometimes two lower rays prolonged. Scales cycloid.

1. A deep notch in the ventral outline of tail at base of lower caudal rays
..... *Bathypterois atricolor*
No notch in the ventral outline of tail at base of lower caudal rays .. 2
2. Llat. 55. Upper filamentous rays of pectoral and outer two rays greatly elongate, reaching basal part of caudal *Bathypterois guentheri*
Llat. 48-51. Upper filamentous rays of pectoral and outer two rays of ventral not reaching caudal base *Bathypterois insularum*

47. *Bathypterois atricolor* Alcock

Bathypterois atricolor Alcock, J. Asiat. Soc. Bengal, 65 (2), p. 306, 1896. Alcock, Ann. Mag. Nat. Hist., (7) 2, p. 146, 1898. Alcock, Illus. Zool. Investigator, pl. 17, fig. 6. 1895.

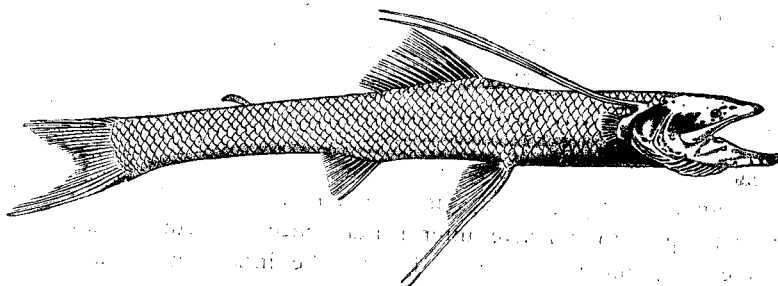


FIG. 47. *Bathypterois atricolor* Alcock. (after Alcock)

D. 15; A. 10; P. 2+12; V. 9. Ll. 52; Ltr. 15.

Body elongate, slightly compressed; snout depressed. Head 4.3, depth of body about 8.5, both in standard length. Eyes very small. Cleft of mouth very wide; maxillary extending greatly beyond eye. Dorsal origin behind base of ventrals and midway between eye and adipose fin. Origin of ventral in vertical through last dorsal ray and midway between hind border of operculum and base of caudal. Two uppermost pectoral rays prolonged, much more than twice length of head. Outermost two rays of ventral produced considerably beyond the rest of the rays, about one and a half times length of head. Caudal forked, lower rays prolonged. A deep notch in the ventral outline of tail at base of lower caudal rays. Colour: Uniform black; fins greyish.

Distribution: Bathypelagic in Atlantic, Indian and Pacific Oceans.

48. *Bathypterois guentheri* Alcock

Bathypterois Guentheri Alcock, Ann. Mag. Nat. Hist., (6) 4, p. 450, 1889. Alcock, Illus. Zool. Investigator, pl. 7, fig. 6, 1892. Alcock, Cat. Indian Deep Sea Fish., p. 157, 1899.

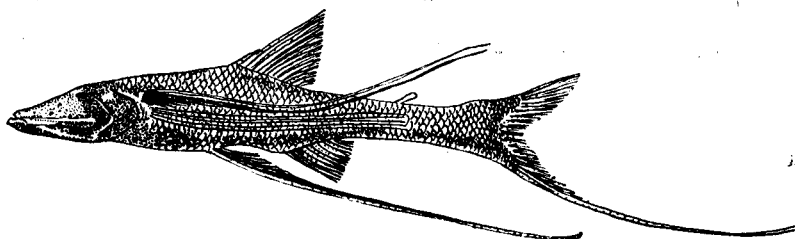


FIG. 48. *Bathypterois guentheri* Alcock. (after Alcock)

D. 13; A. 11; P. 2+6+5; V. 8. Llat. about 55; Ltr. 7+8.

Body elongate and compressed. Depth of body about 6 in standard length. Head 3.5 in standard length. Snout depressed, rounded, with a median

intermaxillary notch. Eye minute, above the middle of maxilla. Nostrils superior, far in front of eye. Maxillary nearly two thirds in head. Teeth in villiform bands in jaws and in a small patch on each side of vomer. Dorsal origin behind base of ventral and nearer to the tip of snout than to the base of caudal. Origin of anal below hind rays of dorsal. Outer rays of ventral reaching to basal third of caudal fin. Upper two rays of pectoral detached, filamentous, almost reaching to upper lobe of caudal; lower five rays of pectoral free. Caudal deeply forked; the lower two rays prolonged with spatulate tips. No notch in the ventral outline at the base of lower caudal rays. Colour: Head almost black, body dark brown. Caudal fin white; other fins blackish except produced rays which are lighter.

Distribution: Off Laccadives and Maldives, Bay of Bengal and Andaman Sea.

49. *Bathypterois insularum* Alcock

Bathypterois insularum Alcock, Ann. Mag. Nat. Hist., (6) **10**, p. 356, 1892. Alcock, Illus. Zool. Investigator, pl. 32, fig. 1, 1895. Alcock, J. Asiat. Soc. Bengal, **65**, p. 33, 1896. Parr, Bull. Bingham Ocean. Coll., **3** (3), p. 27, 1928.

Bathypterois capensis Gilchrist and von Bonde, Fish and Mar. biol. Surv. Rep., **3**, Spec. Rep., 7, p. 8, pl. 2, fig. 1, 1924. Smith, Fishes of Southern Africa, p. 114, pl. 6, fig. 183, 1949.

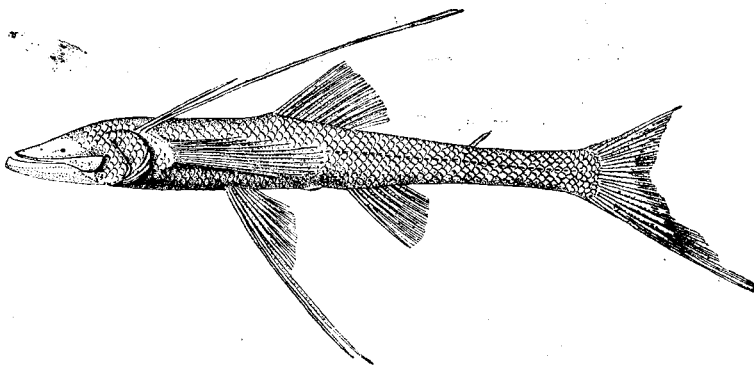


FIG. 49. *Bathypterois insularum* Alcock. (after Alcock)

D. 12-13; A. 8-10; P. 2+12-13; V. 8-9. Llat. 48-51; Ltr. 13.

Body elongate, compressed. Head 4.3, depth of body about 7.5, both in standard length. Snout a little more than one third of head. Interorbital space slightly less than snout. Eyes very small. Cleft of mouth wide; maxillary reaching greatly beyond eye. Dorsal origin half length of snout behind a level from ventral base and nearer to the tip of snout than to the base of caudal. Anal origin immediately behind vertical through the last dorsal ray. Adipose fin midway between dorsal and base of caudal. The two uppermost pectoral rays are

intimately attached in their basal part and reaching behind adipose fin; other pectoral rays which are slender and rigid reaching at least to vent. Outermost two rays of ventrals reaching at least to a vertical from adipose fin. Caudal deeply forked, two or three lower most rays prolonged, their length at least one third of rest of body. The body and head, except the snout and jaws are covered with thin deciduous cycloid scales. Colour: Black; fins greyish.

Distribution: Coast of South Africa, Arabian Sea and Laccadive Sea.

Family ALEPISAUROIDAE

Body and head elongate. Snout produced. Premaxillaries long forming the entire upper jaw. Teeth variable, anterior teeth on premaxillary and mandible larger. Palatine teeth compressed of which two or three longer. Dorsal long, occupying almost the whole length of back. Anal moderate. Body naked. Branchiostegals 5-7.

50. *Alepisaurus ferox* Lowe

Alepisaurus ferox Lowe, Proc. Zool. Soc. London, 1, p. 107, 1833. Goode and Bean, Oceanic Ichth., p. 117, pl. 38, fig. 142, 1895. Smith, Fishes of Southern Africa, p. 116, fig. 187, 1949. Silas, Curr. Sci., 34 (2), p. 5, 1965.

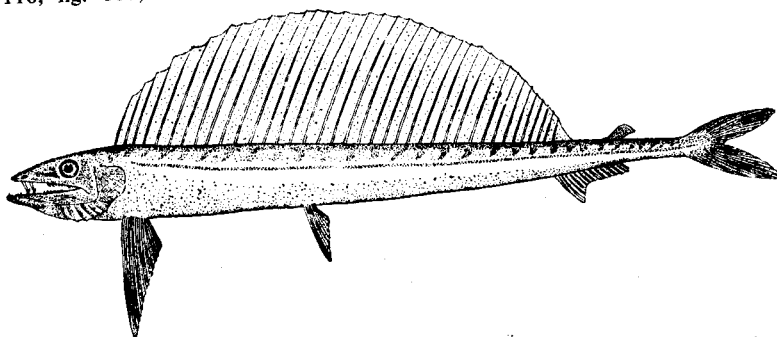


FIG. 50. *Alepisaurus ferox* Lowe. (after Goode and Bean)

Body elongate, compressed. Head 5.0-5.5, depth of body 11-13, both in standard length. Snout pointed, about twice eye diameter. Teeth unequal, the anterior teeth on premaxillary larger and curved. Palatine teeth compressed, triangular, 2 or 3 anterior ones long fangs. Mandibular teeth moderate, 2 or 3 median pairs much enlarged. Origin of dorsal fin above level of posterior margin of operculum; first few rays of the fin elongate and often free from membrane; rest of the fin more or less of even height upto a point half way between ventral and anal, after which the rays become abruptly shorter. Pectoral slightly shorter than head. Upper caudal lobe sometimes produced. Lateral line spongy, slightly stands out from body. Colour: Light with small melanophores on sides. Fin membrane without white spots.

Distribution: Atlantic, Indian and Pacific Oceans.

Family MYCTOPHIDAE

Body moderately elongate and compressed. Mouth large, sometimes oblique. Dorsal nearly in middle of length of body and generally slightly before anal fin or rarely opposite to ventral fin. Adipose opposite to end of anal. Several rows of minute teeth in jaws, vomer and sometimes on palatines and tongue. Gill membranes not united with each other or with isthmus. Pseudo-branchiae present, sometimes rudimentary. Luminous organs present on head and body; sometimes luminous scales present on caudal peduncle. Scales adherent or deciduous, cycloid or ctenoid. Lateral line complete.

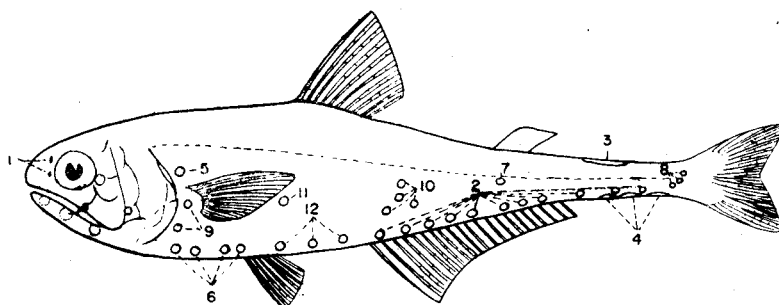


FIG. C. Explanation of photophores in myctophids. 1. Antorbital. 2. Anal (AO). 3. Luminous plate. 4. Luminous scale. 5. Supra pectoral (PLO). 6. Pectoral (PO). 7. Posterolateral (Pol). 8. Precaudal (Prc). 9. Subpectoral (PVO). 10. Supra anal (SAO). 11. Supraventral (VLO). 12. Ventral (VO).

1. Photophores absent. Mouth strongly oblique *Scopelengys tristis*
Photophores present. Mouth slightly oblique 2
2. Maxillary extending to a vertical through hind border of eye; end of maxillary strongly dilated. 2 Pol *Myctophum reinhardti*
Maxillary extending behind vertical through hind border of eye; end of maxillary at the most slightly dilated. 1 Pol 3
3. Snout prominent. Caudal peduncle slender. End of maxillary reaching about 3/4 eye diameter behind eye. 3 SAO almost in a straight line, the first above the last VO *Myctophum andreae*
Snout not prominent. Caudal peduncle fairly deep 4
4. Scales ctenoid; adherent. 3 SAO in an oblique line, the lowest slightly anterior to 4th VO. AO 6-8+6-8 *Myctophum spinosum*
Scales cycloid, deciduous 5
5. 3 SAO almost in a straight line, the first above and slightly behind the fourth VO and the uppermost near lateral line above insertion of anal. AO 11+6 *Myctophum aurolaternatum*
SAO in an oblique line or nearly in right angle 6

6. 3 SAO in an oblique line, the lowest above the last VO, the uppermost just below the lateral line and behind the level from the insertion of anal *Myctophum affine*
- 3 SAO sharply angulate, the first above or slightly behind the second VO and slightly lower than the VLO, the second above and slightly behind the fourth VO and the third just below lateral line in a vertical through anal origin *Myctophum evermanni*

51. *Scopelengys tristis* Alcock

Scopelengys tristis Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 303, 1890. Alcock, Illus. Zool. Investigator, pl. 7, fig. 7, 1892. Parr, Bull. Bingham Ocean. Coll., 3 (3), p. 48, 1928. Norman, John Murray Exp., 7, p. 28, 1939.

Scopelengys dispar Garman, Mem. Mus. Comp. Zool., 24, p. 254, pl. 54, figs. 2-2d, 1899.

D. 11-12; A. 11-13; P. 15; V. 8.

Head and body rather elongate, compressed. Head more than 3 in standard length. Eye high up, very small, its diameter about 3 in snout which is about 1/3 length of head. Mouth wide, its cleft very oblique. Maxillary dilated behind, reaching well beyond hind border of eye and more than half length

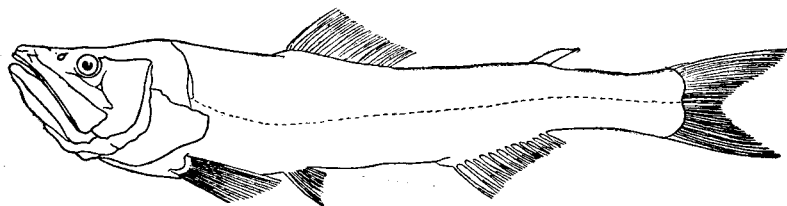


FIG. 51. *Scopelengys tristis* Alcock. (after Alcock)

of head. Acute, villiform teeth in broad bands in jaws, in narrow bands on palatines and in a small patch on each side of head of vomer. Gill openings very wide. Dorsal before front half of body, its origin opposite to that of ventrals. Adipose dorsal rather large, situated opposite to hind rays of anal. Caudal forked. Pectoral reaching past origin of ventrals. No luminous organs. Colour: Uniform black.

Distribution: Laccadive Sea and Pacific coast of Central America.

52. *Myctophum reinhardtii* (Lütken)

Scopelus Reinhardtii Lütken, Spolia Atlantica, Scopelini, p. 257, 1892.

Myctophum benoiti var. *reinhardtii* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 155, fig. 60, 1913.

Myctophum reinhardtii Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 187/36).

Specimens studied: Laccadive Sea 73° 10' E, 10° 05' N (24), 13 to 20 mm. 74° 10' E. 10° 03' N (27), 13 to 28 mm. Off Minicoy (7), 16 to 24 mm.

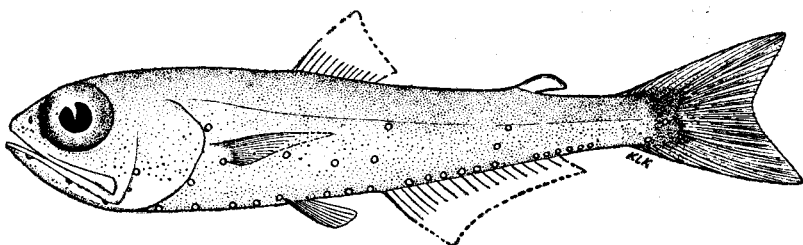


FIG. 52. *Myctophum reinhardtii* (Lütken), 24 mm.

D. 12-13; A. 19-20; P. 13-14; V. 8. Ll. 39-40; GR. 4+1+12-13.

Head 3.1-3.3 in standard length, 3.9-4.2 in total length. Depth of body 3.9-4.3 in standard length, 5.0-5.5 in total length. Eye 3.1-3.4 in head and about 0.4 in snout. End of maxillary strongly dilated, reaching to a vertical through hind border of eye. Origin of dorsal midway between hind border of eye and adipose fin, and slightly behind a level from the insertion of ventrals. Origin of ventral nearer to hind border of operculum than to anal fin. Origin of anal opposite to last ray of dorsal. Ventral as long as postorbital length of head. Scales cycloid, deciduous. Photophores: A dorsal and ventral antorbital; 2 operculars, the larger one on a level with the ventral border of eye, lower smaller one behind the maxillary; 3 branchiostegals; 2 PVO, one at the lower edge of base of pectoral and the anterior above the second PO; PLO midway between origin of lateral line and upper edge of base of pectoral; VLO midway between ventral and lateral line; 5 PO between isthmus and ventral; 4 VO in a straight series between ventral and vent; anterior group of AO 5-7 above anterior 2/3 of anal, posterior group of 5-7, the first two or three of which lie above the anal; 2 Prc, the posterior touching the lateral line; 3 SAO in blunt angle, the anterior above the interspace between second and third VO, the second behind a level from the last VO and the third obliquely above in contact with the lateral line; 2 Pol, the anterior above the last anterior AO and the other above the interspace between the two groups of AO and in contact with the lateral line. Colour: Pale brownish with silvery reflections.

Local name: *Kelahi-fitham* (Minicoy).

Distribution: Widely distributed in the Atlantic, Indian and Pacific Oceans.

53. *Myctophum andreae* (Lütken)

Scopelus (*Rhinoscopelus*) *Andreae* Lütken, *Spolia Atlantica*, Scopelini, p. 245, fig. 3, 1892.

Myctophum andreae Jones, Bull. cent. mar. F.sh. Res. Inst., 8, p. 3, 1969 (Cat. No. CMFRI-LA-F. 187/37).

Centrobranchus gracilicaudus Gilbert, Bull. U.S. Fish. Comm., 23, p. 595, pl. 69, fig. 2, 1905.

Myctophum (*Myctophum*) *Andreae* Brauer, *Valdivia Exped.*, Tiefsee Fische, 15, (1), p. 203, fig. 122, 1906.

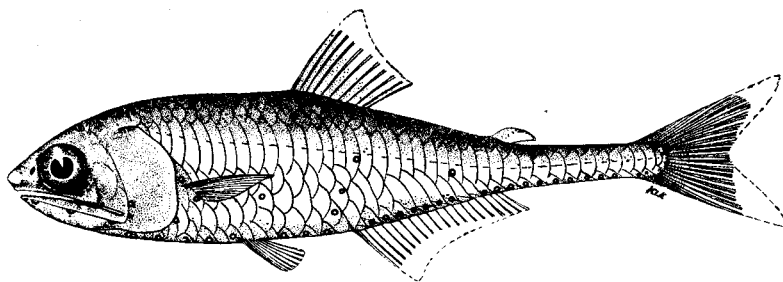


FIG. 53. *Myctophum andreae* (Lütken), 45 mm.

Specimens studied: Laccadive Sea 73° 10' E, 10° 5' N (2), 20 and 45 mm.

D. 12; A. 19; P. 14; V. 8. Ll. 39.

Body robust, tapering to a very slender caudal peduncle. Head 3.7, depth of body 4.2, both in standard length. Eye 3.5 in head, 0.6 in somewhat conical and prominent snout. End of maxillary not dilated, reaching 3/4 eye diameter behind eye. Origin of dorsal midway between hind border of eye and adipose fin and far behind a vertical from the ventral fin. Insertion of ventral midway between preopercular border and anal origin. Anal origin opposite to last rays of dorsal. Pectoral equal to or slightly longer than postorbital length of head. Ventral slightly shorter than half length of head. Scales cycloid. Gill rakers rudimentary. Photophores: A dorsal and ventral antorbital; 3 branchiostegals; 2 operculars, the larger far below the level of lower border of eye, the smaller behind angle of jaws; 2 PVO, the posterior at the lower edge of base of pectoral, the anterior above the interspace between second and third PO; PLO slightly above and before the upper edge of base of pectoral; VLO slightly anterior to a vertical from the first VO, between origin of ventral and lateral line; 5 PO equidistant between isthmus and ventral; 4 VO between ventral and vent; AO in two groups, the anterior group of 6-7 above the first 3/5 of anal, of the posterior group of 10-11 the first two above the anal; 2 Prc on the same level; 3 SAO almost in a straight line, the first above the last VO, the third near lateral line in a vertical from the insertion of anal, the first two

closer together; Pol below the lateral line, above the last organ of the anterior AO. 4 infracaudal luminous scales present in the larger specimen.

Distribution: Widely distributed in the Atlantic; Hawaiian waters, South China Sea and near Japan in the Pacific; near Chagos archipelago, off south of Ceylon, Laccadive Sea and off west of Sumatra in the Indian Ocean.

54. *Myctophum spinosum* (Steindachner)

Scopelus spinosus Steindachner, Ichthyol. Notizen, V. Sitzber. Akad. Wien, **55**, p. 711, 1867.

Myctophum spinosum Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **2**, p. 163, 1913. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 4, 1969 (Cat. No. CMFRI-LA-F. 187/38).

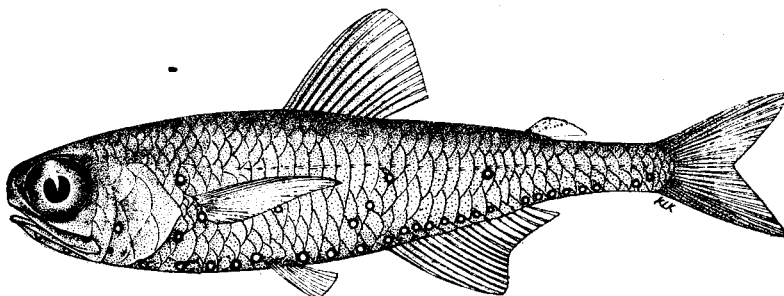


FIG. 54. *Myctophum spinosum* (Steindachner), 74 mm.

Specimens studied: Laccadive Sea about 10 kilometers east of Minicoy (7), 34 to 74 mm. 74° 10' E, 10° 03' N (5), 16 to 70 mm.

D. 13-14; A. 18-20; P. 14-15; V. 8. Ll. 38-40. GR. 6+1+12-14.

Body robust, tapering from nape to moderately deep caudal peduncle. Head 3.7-3.9 in standard length, 4.4-4.7 in total length. Depth of body 4.0-4.3 in standard length, 4.8-5.3 in total length. Eye 2.6-2.8 in head and about 0.3 in short snout. Mouth terminal, end of maxillary slightly dilated, reaching behind a level from the posterior border of eye. Origin of dorsal nearer to adipose fin than to tip of snout and slightly behind origin of ventrals which is nearer to anal origin than to hind margin of preoperculum. Adipose fin above end of anal. Anal origin midway between hind border of eye and base of caudal. Pectoral equal to or slightly shorter than head, reaching nearly to vent. Ventral as long as postorbital length of head. Scales strongly ctenoid. Photophores: A dorsal and ventral organ at the anterior border of eye; 2 operculars, the upper one below level of lower border of eye and the smaller one in a level of the hind margin of upper jaw; 3 branchiostegals; 2 PVO; PLO above the anterior PVO midway between base of pectoral and lateral line; VLO nearer to lateral line than to ventral fin behind a vertical from the insertion of ventral;

5 PO between isthmus and ventrals; 4 VO between ventral and vent; AO in two groups, the anterior group of 6-8 above anterior 2/3 of anal fin, the posterior group of 6-8, one or two of which above the end of anal; 2 Prc separated from the AO, the posterior one slightly high up; 3 SAO in an oblique line, the lowest slightly anterior to 4th VO, the upper one just below the lateral line in a vertical through last dorsal ray; Pol above last AO of the anterior group just below the lateral line. Supracaudal and/or infracaudal luminous scales present in some specimens. Colour: Dark bluish on back becoming silvery below. Fins hyaline except anterior rays of dorsal and lobes of caudal which are slightly dusky.

Local name: *Kelahi-fitham* (Minicoy).

Distribution: Atlantic, Indian and Pacific Oceans.

55. *Myctophum aurolaternatum* Garman

Myctophum aurolaternatum Garman, Mem. Mus. Comp. Zool., Harvard, 24, p. 264, pl. 55, fig. 3, 1899. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 163, fig. 1, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 187/39).

Myctophum (*Myctophum*) *aurolineatus* Bolin, Stanford Ichth. Bull., 1, p. 108, fig. 10, 1939.

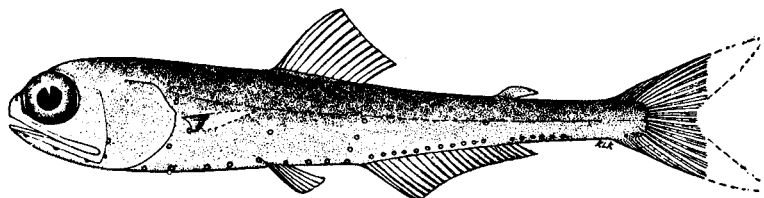


FIG. 55. *Myctophum aurolaternatum* Garman, 39 mm.
(after Jones and Kumaran)

Specimen studied: Laccadive Sea 74° 10' E, 10° 03' N (1), 39 mm.

D. 13; A. 23; P. 13; V. 8. Ll. 44. GR. 5+1+11.

Head 3.6 and depth of body 5.2, both in standard length. Eye 3.1 in head and about 0.35 in bluntly rounded snout. End of maxillary slightly dilated, reaching 1/3 diameter of eye behind eye. Dorsal origin midway between hind border of eye and origin of adipose fin and behind insertion of ventral. Ventral origin nearer to hind border of operculum than to origin of anal fin. Anal origin slightly behind a level from the end of dorsal base. Scales cycloid, deciduous. Photophores: An antorbital at the lower anterior margin of eye; 2 operculars, the dorsal one below level of the lower margin of eye, the lower smaller one opposite the hind end of upper jaw; 3 branchiostegals; PLO midway between

lateral line and insertion of pectoral; 2 PVO, the posterior before the lower base of pectoral, the anterior above the second PO; VLO slightly behind the insertion of ventral, between ventral and lateral line; 5 PO between isthmus and ventral, the third and fourth closer than others; 4 VO in a straight series between ventral and vent; the anterior group of 11 AO above the first 3/4 of anal fin, the posterior group of 6 begins above the last anal ray; 2 Prc obliquely behind each other; 3 SAO in almost a straight line, the first above and slightly behind fourth VO and the uppermost near lateral line above insertion of anal; Pol near lateral line slightly behind the last organ of the anterior group of AO. Colour: Brownish on back, slightly lighter below.

Distribution: Laccadive Sea in the Indian Ocean, off the coast of Panama and Gulf of California in the Eastern Pacific.

56. *Myctophum affine* (Lütken)

Scopelus affinis Lütken, Spolia Atlantica, Scopelini, p. 252, 1892.

Myctophum affine Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 161, 1913. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 187/40).

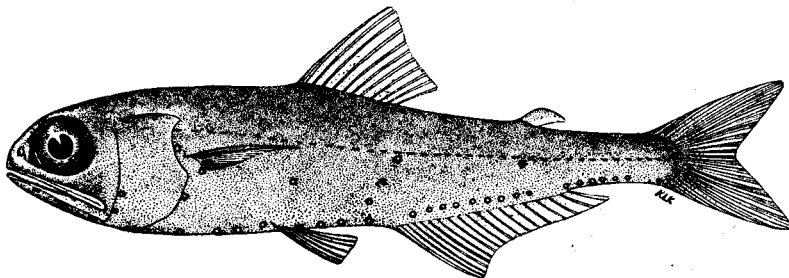


FIG. 56. *Myctophum affine* (Lütken), 61 mm.

Specimens studied: Laccadive Sea 73° 39' E, 10° 49' N (26), 16 to 28 mm. 75° 03' E, 10° 24' N (1), 61 mm. 74° 10' E, 10° 03' N (43), 15 to 36 mm.

D. 12-13; A. 19-20; P. 14-15; V. 8. Ll. 39-40. GR. 5+1+13-14.

Body tapering evenly from nape to moderately heavy caudal peduncle. Head 3.7-3.9 in standard length, 4.5-4.8 in total length. Depth of body 3.9-4.3 in standard length, 5.0-5.3 in total length. Eye 2.7-3.1 in head and about 0.3-0.4 in steep and blunt snout. Mouth terminal, end of maxillary slightly dilated, reaching well behind hind border of eye. Origin of dorsal nearer to adipose fin than to tip of snout, opposite to or slightly behind insertion of ventrals. Origin of anal midway between margin of preoperculum and base of caudal or

slightly nearer to the latter and below the last ray of dorsal. Pectoral about 1.4-1.5 in head, ventral about half length of head. Scales cycloid, deciduous. Photophores: An antorbital; 2 operculars, the larger below the level of lower border of eye, the smaller below behind end of maxillary; 3 branchiostegals; one PLO above second PO nearer to the insertion of pectoral than to the lateral line; VLO nearer to the lateral line than to insertion of pectoral; 5 PO between isthmus and ventral; 4 VO between ventral and vent; AO in two groups, anterior group of 7-9 above base of anal, posterior group 4-6, the first one of which is above the last anal ray; 3 SAO in an oblique line, the lowest above the last VO; the uppermost just below the lateral line and behind the level from the insertion of anal; one Pol just below the lateral line, above the last AO of the anterior group; 2 Prc the posterior somewhat elevated; 4 infracaudal luminous scales in large specimens. Colour: Brown above with dark pigments, silvery below. Fins hyaline, base of caudal dark.

Distribution: Atlantic, Indian and Pacific Oceans.

57. *Myctophum evermanni* Gilbert

Myctophum evermanni Gilbert, Bull. U.S. fish. Comm., 23, p. 597, 1905. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 2, p. 162, fig. 63, 1913. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 164, fig. 2, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 187/41).

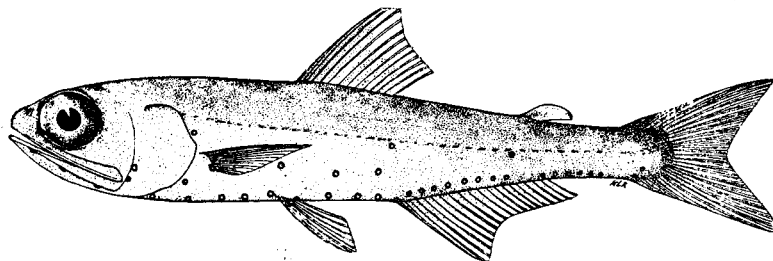


FIG. 57. *Myctophum evermanni* Gilbert, 58 mm.
(after Jones and Kumaran)

Specimens studied: Laccadive Sea 73° 10' E, 10° 05' N (1), 58 mm. 74° 10' E, 10° 03' N (9), 39 to 70 mm. 75° 03' E, 10° 24' N (4), 24 to 57 mm.

D. 13-15; A. 20-21; P. 14-15; V. 8. Ll. 38-39. GR. 5+1+13.

Head 3.2-3.5 in standard length, 4.1-4.4 in total length. Depth of body 4.4-4.8 in standard length, 5.5-6.0 in total length. Eye 3.1-3.5 in head and 0.4-0.5 in snout. End of maxillary slightly dilated, reaching half eye diameter behind eye. Pectoral equal to postorbital length of head and 1/2 eye diameter together. Origin of dorsal slightly behind a level from the origin of ventral and

midway between hind border of eye and adipose fin. Origin of ventral somewhat nearer to operculum than to insertion of anal. Anal origin opposite to or slightly behind last ray of dorsal. Scales cycloid, deciduous. Photophores: A dorsal and ventral antorbital; 2 operculars; 3 branchiostegals; 2 PVO; PLO between lateral line and origin of pectoral; VLO between lateral line and base of ventral; 5 PO equidistant between isthmus and ventral; 4 VO equidistant between ventral and vent; 7-9 organs in the anterior group of AO above anterior 3/4 of anal, posterior AO of 4-6, the first one of which is above the last ray of anal; 2 Prc, the posterior slightly at a higher level; 3 SAO sharply angulate, the first above or slightly behind the second VO and slightly lower than the VLO, the second above the fourth VO, the third just below the lateral line in a vertical through insertion of anal; one Pol just below the lateral line above the last AO of the anterior group. Colour: Brownish on back becoming lighter below, sides of head whitish.

Distribution: Laccadive Sea, Halmahera Sea, Banda Sea, Manipa Strait, near Japan and around Hawaiian Islands.

Order CYPRINIFORMES

A Weberian apparatus connecting the ear with air bladder present. Fins usually without spines; sometimes the dorsal with one or two spines and the anal and ventral with one spine each. Mostly fresh water fishes.

Family CYPRINIDAE

Body oblong to ovate; head and body somewhat compressed, head sometimes depressed. Mouth terminal, inferior or subinferior, bordered above by intermaxillaries. Dorsal fin single, short, with or without a serrated spine and similar to anal. Sometimes a rostral and maxillary pair of barbels present. Scales small or moderate. Lateral line when present, complete or incomplete.

Last undivided ray of dorsal smooth. Dorsal with 8 soft rays

..... *Puntius burmanicus*

Last undivided ray of dorsal serrated behind. Dorsal with 17-19 soft rays

..... *Cyprinus carpio*

58. *Puntius burmanicus* (Day)

Barbus Burmanicus Day, Fishes of India, p. 572, pl. 141, fig. 4, 1878.

Puntius burmanicus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 29/42).

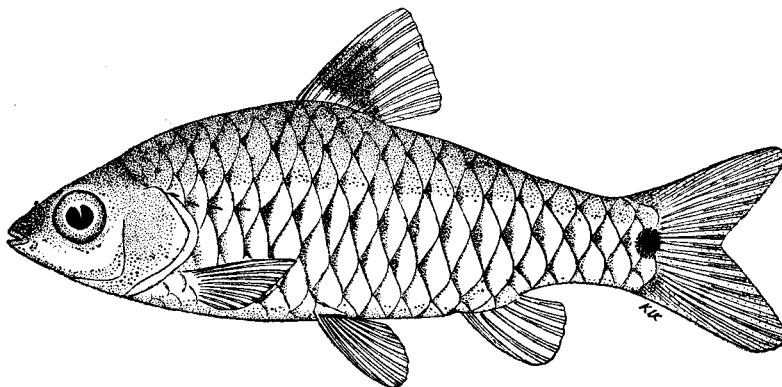


FIG. 58. *Puntius burmanicus* (Day), 34 mm.

Specimens studied: Kavarathi (8), 31 to 41 mm. Minicoy (3), 32 to 34 mm.

D. iii, 8; A. ii, 5; P. 14. Ll. 23; Ltr. 4+1+3.

Head 3.3-3.5 in standard length, 4.1-4.3 in total length. Depth of body 2.9-3.0 in standard length, 3.5-3.7 in total length. Eye 3.2-3.3 in head, 0.8 in

snout and 1.1-1.2 in interorbital space. Dorsal profile steeply ascending with a slight concavity at nape. Mouth terminal. Maxilla not reaching to eye. Barbels minute. Origin of dorsal fin slightly in front of a vertical from the ventral origin and midway between tip of snout and base of caudal. Last undivided ray of dorsal strong, but not serrate. Lateral line incomplete. Colour: Yellowish grey, centre of scales darker; a dark brown spot at base of caudal. Fins pale yellowish; dorsal with a broad dark band.

Local names: *Puzha-meen* (Kavarathi). *Dathurumas* (Minicoy).

Distribution: Fresh and brackish water species. ^{Laccadives}Minicoy, Kerala, Burma and Malaya. This species was introduced into the freshwater ponds of Minicoy some years ago from the mainland.

59. *Cyprinus carpio* Linnaeus

Cyprinus carpio Linnaeus, Syst. Nat., ed. 10, 1, p. 320, 1758. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 102, 1916. Munro, Fishes of Ceylon, p. 42, pl. 7, fig. 110, 1955.

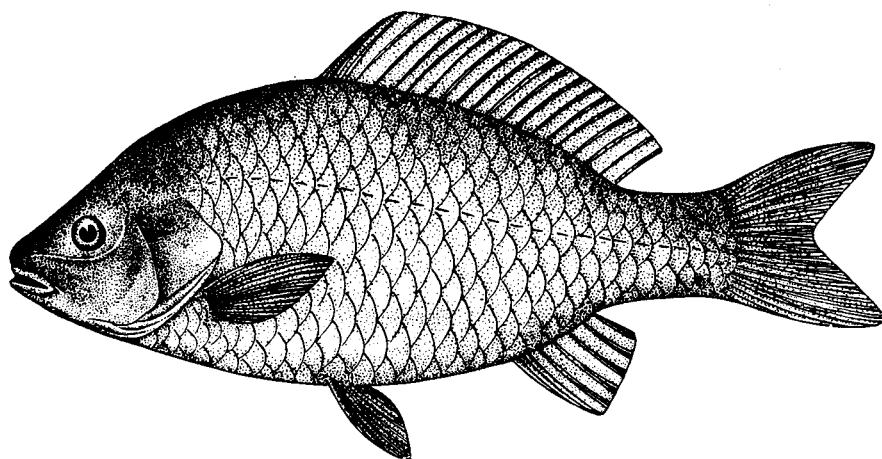


FIG. 59. *Cyprinus carpio* Linnaeus, 165 mm.

Specimens studied: Kavarathi (8), 85 to 165 mm.

D. III, 17-19; A. III, 5; P. I, 15; V. I, 8-9. Ll. 35-38; Ltr. 5+1+7.

Head 3.0-3.5 in standard length, 3.8-4.4 in total length. Depth of body 2.8-3.2 in standard length, 3.5-4.0 in total length. Eye 5.0-5.3 in head, 1.5-1.6 in snout and about twice in interorbital space. Mouth terminal with four barbels. Dorsal fin long, last simple ray ossified and serrated behind. Anal origin below hind half of dorsal, its last simple ray ossified and serrated behind. Lateral

line complete. Pectoral slightly shorter than head without snout. Colour: Oliveaceous, back darker, sides silvery or golden. Fins yellowish or golden.

Note: Introduced in the freshwater ponds in 1966 by the Fisheries Department of the Laccadive Administration. The common carp which is originally a native of China has been introduced all over Europe, Asia, America and several other parts of the world.

Order ANGUILLIFORMES

Body elongate and snake-like. Air bladder when present connected with the intestine by a duct. Body usually naked or with minute embedded scales. Generally no pelvic fins. Mouth bordered by the maxillaries and the coalesced premaxillaries and mesethmoid. Dorsal and anal fins variably developed, generally long and confluent with caudal; sometimes absent. Gill openings usually restricted.

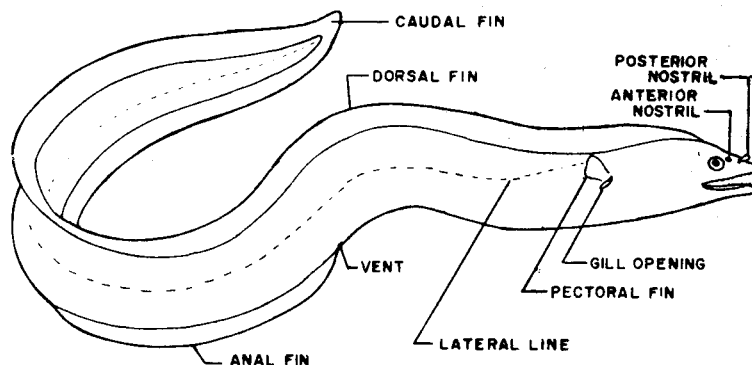


FIG. D. Explanation of external characters of the Order Anguilliformes.

1. Gill openings close together on lower surface; minute rudimentary scales present on postorbital part of head and body SYNAPHOBRANCHIDAE
Gill openings widely separated and lateral in position; head and body naked or not perceptibly scaly 2
2. Distance of vent from gill openings less than head length; jaws slender and much produced NEMICHTHYIDAE
Distance of vent from gill openings much greater than head length; jaws not slender and not much produced 3
3. Patches of minute scales on body ANGUILLIDAE
Body naked 4
4. Dorsal and anal fins not reaching tip of tail. Tail devoid of caudal fin OPHICHTHYIDAE
Dorsal and anal fins confluent with caudal fin 5
5. Pectoral fins absent; median fins in thick skin MURAEINIDAE
Pectoral fins present or absent; median fins not buried in thick skin .. 6
6. Posterior nostrils are slits in upper lip ECHELIDAE
Posterior nostrils are holes near eye 7
7. Dorsal, anal and caudal fins developed CONGRIDAE
Dorsal and anal fins restricted to tail and partly suppressed MORINGUIDAE

Family SYNAPHOBRANCHIDAE

Body slender, moderately compressed. Gill openings wide slits close together on lower surface. Minute rudimentary scales present. Snout conical, jaws subequal. Mouth extending well behind eye. Teeth small, in narrow bands in jaws and on vomer. Vent in anterior third of total length. Lateral line distinct.

60. *Synaphobranchus pinnatus* (Gronov)

Muraena pinnata Gronov, Cat. Fishes, p. 19, 1854.

Synaphobranchus pinnatus Günther, Cat. Fish. Brit. Mus., 8, p. 23, 1870. Günther, *Challenger Rep. Deep Sea Fish.*, 22, p. 253, pl. 62, fig. A, 1887. Goode and Bean, *Oceanic Ichth.*, p. 143, pl. 44, fig. 164, 1895. Alcock, *Ann. Mag. Nat. Hist.*, (7) 2, p. 151, 1898.

Synapobranchus pinnatus Smith, *Fishes of Southern Africa*, p. 386, fig. 1089, 1949.

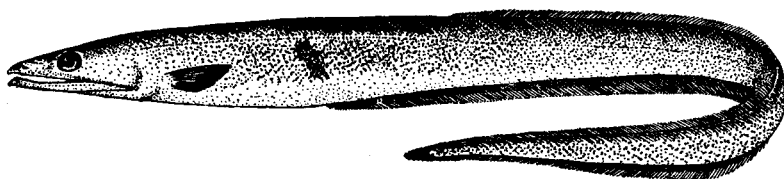


FIG. 60. *Synaphobranchus pinnatus* (Gronov). (after Günther)

Body elongate and compressed. Head 8.0-8.2, depth 19-20, both in total length. Eye more than 7 in head. Snout 3 in head. Length of body more than twice in tail. Snout conical, its upper profile somewhat convex with the fleshy tip slightly protruding. Maxillary not free. Teeth small, in narrow bands in jaws with numerous minute teeth along outer edges. Moderately large conical teeth in a short row on vomer. Anterior nostril in first fourth of snout, posterior nostril almost a horizontal slit about last fourth in snout. Gill openings about 3/4 eye diameter. Origin of dorsal fin slightly behind vertical from vent. Pectoral shorter than half length of head. Colour: Uniform brown, darker below.

Distribution: Widely distributed in the Atlantic, Indian and Pacific Oceans.

Family ANGUILLIDAE

Elongate, anteriorly subcylindrical, posteriorly compressed. Scales minute, embedded in the skin. Anterior nostrils tubular, near anterior margin of snout, posterior nostrils in front of eye. Teeth small, conical, in bands on jaws and vomer. Origin of dorsal before or somewhat behind anal origin. Pectoral well developed.

61. *Anguilla bicolor* McClelland

Anguilla bicolor McClelland, Calcutta Journ. Nat. Hist., 5, p. 178, 1845. Day, Fishes of India, p. 660, pl. 167, fig. 3 and pl. 168, fig. 2, 1878. Smith and Smith, Fishes of Seychelles, p. 56, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 39/510).

Anguilla australis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3 p. 249, 1916 (in part).

Anguilla bicolor bicolor Munro, Fishes of Ceylon, p. 57, pl. 12, fig. 157, 1955.

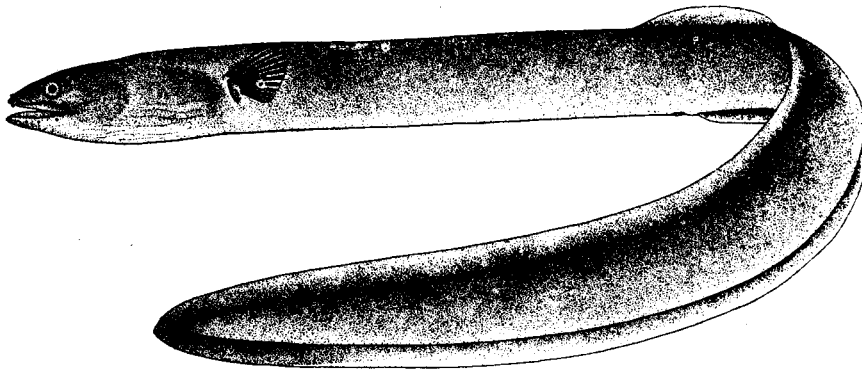


FIG. 61. *Anguilla bicolor* McClelland, 460 mm.

Specimen studied: Minicoy (fresh water pond) (1), 460 mm.

Head 7.2, depth of body 17, both in total length. Eye 11.7 in head and about 1.9 in snout. Snout 6.5 in head. Head and trunk 1.3 in tail. Head twice in trunk. Distance between origin of dorsal and anal thrice in head. Gape of mouth extending well beyond eye. Pectoral thrice in head. Many rows of small teeth in a continuous band on intermaxillary and maxillary, tapering posteriorly. Band of teeth on mandibles tapering behind. An elongate band of teeth on vomer. Colour: Light brownish blue on back and sides becoming pale yellowish below.

Local name: *Valuveng* (Minicoy).

Distribution: East coast of Africa, Seychelles, Laccadives, coasts of India, Ceylon, Andamans, Burma, Malaysia and Indonesia.

Family MURAENIDAE

Body naked, very much elongate, rounded or somewhat compressed. Snout short and rounded, the lower jaw as long as or slightly shorter than the upper jaw. Anterior nostrils tubular near tip of snout, posterior nostrils over the eye or somewhat in front of it. Dorsal and anal fin confluent with the short

caudal fin; sometimes fins are reduced to rudiments. Pectorals absent. Vent far behind gill openings, in about middle of length. Gill openings restricted to small opening on the side of the body. Teeth granular, conical, compressed molar-like or fang-like and depressible in one or more rows in jaws, on intermaxillary and on vomer.

1. Dorsal fin well developed, originating over or a little in front of the gill opening 2
 Origin of dorsal fin more than one head length behind gill openings or reduced to rudiments at tip of tail 20
2. Usually some of the teeth granular or molar-like, at least on vomer; no canines 3
 Teeth not molar like, although there may be short and conical teeth; usually some canine like teeth present 7
3. Tail 1.7-2.2 in head and trunk. Teeth on intermaxillary continuous with those of vomer. Blackish brown with 55-105 narrow white rings *Echidna zebra*
 Tail equal to or a little shorter or longer than head and trunk 4
4. Dark brown with about 24-29 narrow yellowish to white rings; some of which are incomplete and bifurcating; corner of mouth blackish *Echidna polyzona*
 No dark brown or white rings encircling body 5
5. Two longitudinal rows of 23-28 large reticulated or dendritic black blotches with pale centres and numerous reticulated lines or spots; upper row of blotches extending on to dorsal fin and each blotch of lower row connected with blackish blotch below *Echidna nebulosa*
 Colour pattern not as above 6
6. Origin of dorsal on rear of head nearer to gill opening than to rictus. Head, body and fins brownish with reticulated pale lines in the form of an irregular net work *Echidna delicatula*
 Origin of dorsal slightly before a level from gill openings. Plain brownish; a broad area behind eye lighter; mucus pores below eye and hind nostrils white; an oblique elongate dark blotch on upper and lower jaw in front of corner of mouth; dorsal and anal fins edged white *Echidna leucotaenia*
7. Anterior nostrils with thickened rim and bilobed flap posteriorly; posterior nostrils large with a membranous rim *Enchelynassa canina*
 Anterior nostrils simple, without bilobed flap behind; posterior nostrils without tubes 8
8. Premaxillary teeth with three inner rows extending to $\frac{1}{4}$ - $\frac{1}{2}$ length of toothed area from symphysis in addition to the marginal row; these inner rows enlarged and fang-like *Gymnothorax buroensis*

- Premaxillary teeth with a single inner row of teeth within the marginal series 9
9. Inner row of teeth moderate and not fang-like; two rows of teeth on vomer. No fang-like teeth at symphysis of maxillary 10
- Median row of teeth on premaxillary enlarged, canine-like or fang-like .. 11
10. Yellowish grey with dark brown reticulations, bars irregular and broken; lower part of head and abdomen mottled with brown. Lower jaw and upper lip more or less barred *Gymnothorax richardsoni*
- Grey above, white below with small black spots on head, body and tail except ventral region of abdomen *Gymnothorax pictus*
11. Plain brown; eye in a rectangular deep blotch which extends about one eye diameter behind eye; 4 mucus pores on side of lower jaw and 3 on side of upper jaw and hind nostril white
- *Gymnothorax monostigmus*
- Eye not in a black blotch 12
12. Height of dorsal fin near vent $2/3$ depth of body. Brown, reticulated with white *Gymnothorax pseudothyrsoides*
- Height of dorsal fin over vent about three times in depth of body .. 13
13. Head and body plain brown; median teeth of premaxillary fang-like
- *Gymnothorax monochrous*
- Colour not plain brown as above 14
14. Gill opening in a black blotch 15
- Gill opening not in a black blotch 16
15. Brownish with numerous small black spots on head, trunk and tail; lower side of head and belly not spotted. Corner of mouth dark
- *Gymnothorax javanicus*
- Brownish to blackish, densely mottled with light brown or whitish spots; corner of mouth often dark *Gymnothorax flavimarginatus*
16. Pale yellowish with a few black spots on head; trunk and tail with irregular rows of black spots; black bars on fins extending obliquely backward and outward; dorsal and anal often with a light border
- *Gymnothorax fimbriatus*
- No distinct black spot behind eye 17
17. 16-21 black rings separated by pale interspaces 18
- Body not encircled with black and white rings 19
18. 16-20 black rings narrower than ground colour completely encircling head, body and fins; first ring across eye, the second behind corner of mouth and the third just in front of gill openings *Gymnothorax ruppelli*
- 17-21 black rings as wide as interspaces in juveniles and broader than interspaces in adults; some of the bands before vent not meeting ven-

- trally; rings not extending to edges of fins posteriorly; the first band through eye not reaching lower jaw, the second band from origin of dorsal and the third from dorsal through gill opening or just behind vent *Gymnothorax petelli*
19. Head, body and fins covered with large brown blotches or vertical bars separated by narrow whitish interspaces more or less inter-connecting; lower side of head and thorax pale brownish. Mucus pores on jaws white *Gymnothorax undulatus*
- Head, body and fins with very large, more or less polygonal black blotches separated by yellowish white interspaces *Gymnothorax permistus*
20. Hind nostril a single pore. Yellowish to brownish grey, everywhere marbled or with spots of brown, olive and blackish *Uropterygius marmoratus*
- Hind nostrils of two adjacent pores over each eye 21
21. Pale with irregular vertical reticulated brownish bars on sides; lower side of head and abdomen pale; lips often barred; mucus pores on head white; caudal fin whitish *Anarchias cantonensis*
- Uniform dark brown; mucus pores on head lighter, caudal fin whitish *Anarchias fuscus*

62. *Echidna zebra* (Shaw)

- Gymnothorax zebra* Shaw, Naturalists Miscellany, 9, pl. 322, 1797.
- Arndha zebra* Munro, Fishes of Ceylon, p. 60, pl. 11, fig. 159, 1955.
- Echidna zebra* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 345, fig. 168, 1916. Smith, Ichth. Bull., 23, p. 423, pl. 60, C, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/43).
- Muraena zebra* Day, Fishes of India, p. 673, pl. 169, fig. 5, 1878.



FIG. 62. *Echidna zebra* (Shaw), 600 mm.

Specimens studied: Chetlat (2), 385 and 600 mm. Kiltan (1), 925 mm. Minicoy (1), 575 mm.

Head 9.0-10.2, depth of body 15.2-18.3, both in total length. Eye 10-13 in head, 1.5-1.7 in snout and 1.5-2.3 in interorbital space. Snout 6.6-7.6 in head. Tail 1.7-2.2 in head and trunk. Cleft of mouth 2.5-2.9 in head, reaching far behind eye. Teeth all granular, in two series in upper and in 3 or 4 series in lower jaw, those on sides of jaws smaller; inner row of teeth on premaxillary continuous with teeth on vomer. Anterior nostril tubular near tip of snout, posterior nostril with raised rim, above the anterior border of eye. Dorsal origin about over gill openings. Colour: Blackish brown, encircled by 55-105 narrow white rings, some of them incomplete.

Local names: *Mudiveng* (Minicoy). *Kadukkamalanhi* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Hawaiian and Samoan Islands and Australia.

63. *Echidna polyzona* (Richardson)

Muraena polyzona Richardson, Voy. *Sulphur*, Fishes, 3, p. 112, pl. 55, figs. 11-14, 1845.

Day, Fishes of India, p. 673, 1878 (text only).

Echidna polyzona Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 346, fig. 169, 1916. Smith, Ichth. Bull., 23, p. 423, pl. 60, D, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/44).



FIG. 63. *Echidna polyzona* (Richardson), 265 mm.

Specimens studied: Chetlat (1), 265 mm. Kadamat (2), 98 and 117 mm. Kiltan (1), 180 mm. Minicoy (1), 171 mm.

Head 7.0-7.8, depth of body 15.5-19.0, both in total length. Eye 8.8-9.5 in head, 1.3-1.5 in snout and equal to interorbital space. Snout 6.2-6.5 in head, cleft of mouth 2.9-3.2 in head, reaching behind eye. Head and trunk equal to or slightly shorter than tail. Teeth generally in two series in jaws, conical in young becoming blunter with age; teeth on premaxillary in a peripheral series enclosing 3 larger mesial teeth and more or less continuous with a group of vomerine teeth. Anterior nostril tubular on each side of tip of snout, posterior nostril above anterior fourth of eye with raised rim. Dorsal origin

nearer to gill opening than to rictus. Colour: Dark brown with about 24-29 narrow yellowish to white rings; some of the rings incomplete and bifurcating. Corner of mouth blackish.

Local names: *Mudiveng* (Minicoy). *Kadukkamalanhi* (other islands).

Distribution: From the Red Sea and east coast of Africa, Laccadives, India, Indonesia, Philippines and Ryukyu, Marshall, Hawaiian and Tuamotu Islands.

64. *Echidna nebulosa* (Ahl)

- Muraena nebulosa* Ahl, Dissert. de Muraena et Ophichtho, p. 5, pl. 1, fig. 2, 1789. Day, Fishes of India, p. 673, pl. 172, fig. 2, 1878.
Echidna nebulosa Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 348, fig. 170, 1916. Munro, Fishes of Ceylon, p. 60, pl. 11, fig. 160, 1955. Smith, Ichth. Bull., 23, p. 423, pl. 60, F, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/45).



FIG. 64. *Echidna nebulosa* (Ahl), 295 mm.

Specimens studied: Bitra (8), 50 to 300 mm. Kavarathi (5), 145 to 310 mm. Kiltan (3), 165 to 180 mm. Minicoy (13), 75 to 295 mm.

Head 8.6-10.0, depth of body 15.5-18.2, both in total length. Head 3.1-4.2 in trunk. Tail slightly shorter than head and trunk. Eye 9.1-11.4 in head, 1.5-2.0 in snout and 1.3-1.6 in interorbital space. Cleft of mouth 2.9-3.3 in head, reaching far behind eye. Teeth conical, blunter with age, on premaxillary in a semicircle with 1 to 3 mesial teeth. Maxillary teeth smaller, in a single series. Two irregular rows of teeth on vomer. Teeth on mandible in two rows anteriorly and in one row posteriorly. Anterior nostrils tubular, on each side of tip of snout; posterior nostrils with raised rims before a level from the anterior border of eye. Origin of dorsal slightly anterior to a level from gill opening. Colour: Yellowish to whitish with two lengthwise rows of 23-28 large reticulated or dendritic black blotches with pale centres and numerous broken or reticulated blackish lines or spots; the upper row of blotches along back extending on to dorsal fin; each reticulated blotch of lower row connected with blackish blotch below. In young specimens upto 100 mm. the two rows of black blotches lack pale centres and have unbroken edges and in still smaller

specimens below 60 mm. the general colour is pale brownish with 3 brown blotches on posterior part of head, interspaces between the blotches being whitish.

Local names: *Mouveng* (Minicoy). *Malanhi* (other islands).

Distribution: From the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Australia and to Marshall and Hawaiian and Tahiti Islands.

65. *Echidna delicatula* (Kaup)

Poecilophis delicatulus Kaup, Cat. Apodal Fish. British Mus., p. 102, 1856.

Echidna delicatulus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 350, 1916. Munro, Fishes of Ceylon, p. 60, pl. 11, fig. 162, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/46).

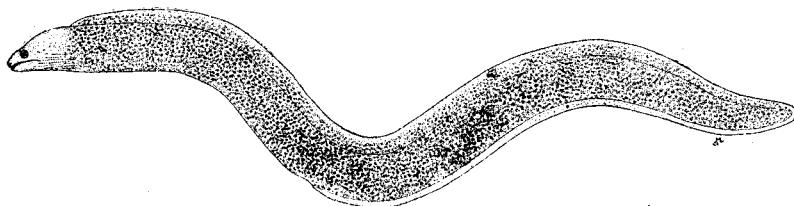


FIG. 65. *Echidna delicatula* (Kaup), 282 mm.

Specimens studied: Bitra (2), 156 and 192 mm. Kavarathi (4), 132 to 282 mm. Kiltan (5), 158 to 230 mm. Minicoy (4), 140 to 180 mm.

Head 8.5-9.4, depth of body 15.2-17.0, both in total length. Head 2.5-3.0 in trunk. Tail about 1.0-1.5 length of head longer than head and trunk. Eye 9.8-11.6 in head, 1.5-1.8 in snout and 1.3-1.5 in interorbital space. Cleft of mouth 2.8-3.4 in head. Anterior nostrils tubular, on each side of tip of snout; posterior nostrils with slightly raised rims, above anterior border of eye. Teeth conical, in the premaxillary more or less in a semicircle with 2 stout mesial teeth separated from 2-3 series of blunt teeth on vomer; in the maxillary in 2 series; teeth on mandible in 2 series anteriorly and often in one series posteriorly. Dorsal origin on rear of head, nearer to gill opening than to rictus. Colour: Pale whitish, everywhere irregularly mottled with brown or brownish with reticulated pale lines in the form of an irregular network; snout white in small specimens.

Local names: *Kiruveng* (Minicoy). *Vellamalanhi* (other islands).

Distribution: Laccadives, Ceylon and Indonesia to the Philippines, Ryukyu Islands, Japan and Samoan and Marquesas Islands.

66. *Echidna leucotaenia* Schultz

Echidna leucotaenia Schultz, Bull. U.S. Nat. Mus., 180, p. 22, pl. 3, 1943. Schultz, Bull. U.S. Nat. Mus., 202, 1, p. 105, fig. 21, e, f and pl. 12, 1953. Smith, Ichth. Bull., 23, p. 423, pl. 60, A and B, 1962. Smith and Smith, Fishes of Seychelles, p. 57, pl. 42, A and B, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 382, fig. 3, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/47).

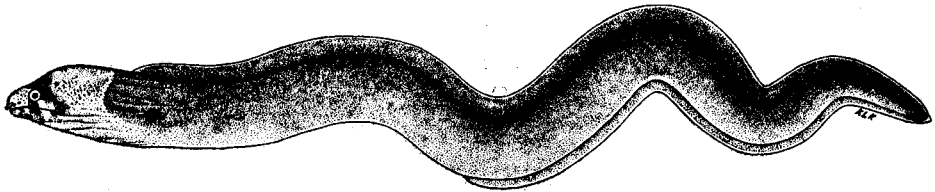


FIG. 66. *Echidna leucotaenia* Schultz, 305 mm.
(after Jones and Kumaran)

Specimens studied: Kadamat (1), 190 mm. Kavarathi (3), 198 to 283 mm. Minicoy (2), 240 and 305 mm.

Head 7.3-8.0, depth of body 14.0-16.2, both in total length. Head 2.4-2.7 in trunk. Eye 8.5-9.6 in head, 1.3-1.6 in snout and 1.1-1.3 in interorbital space. Cleft of mouth 2.3-2.9 in head. Anterior nostrils tubular, on each side of tip of snout; posterior nostrils with slightly raised rims, slightly behind a level from the front border of eye. Teeth all granular, except those at symphysis of upper jaw which are somewhat conical; uniserial in upper jaw, biserial in lower jaw; 2 or 3 teeth on intermaxillary and 2-3 series on vomer. Dorsal origin on rear of head before a level from the gill opening. Colour: Plain brownish; a broad lighter area behind eye; edges of dorsal and anal fins white; tip of snout and lower jaw pale to brownish; mucus pores below eye and posterior nostrils white; an oblique elongate dark blotch on upper and lower jaw anterior to corner of mouth.

Local names: *Huduveng* (Minicoy). *Malanhi* (other islands).

Distribution: So far known only from Pinda, Aldabra, Seychelles and Laccadives in the Indian Ocean and Marianas, Marshall, Phoenix and Samoan Islands in the Pacific.

67. *Enchelynassa canina* (Quoy and Gaimard)

Muraena canina Quoy and Gaimard, Voy. *Uranie*, Zoology, p. 247, 1824.

Enchelynassa canina Smith, Ichth. Bull., 23, p. 430, pl. 54, B, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, 10, p. 321, fig. 1, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/511).

Muraena (Enchelynassa) canina Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 390, fig. 191 and 192, 1916.

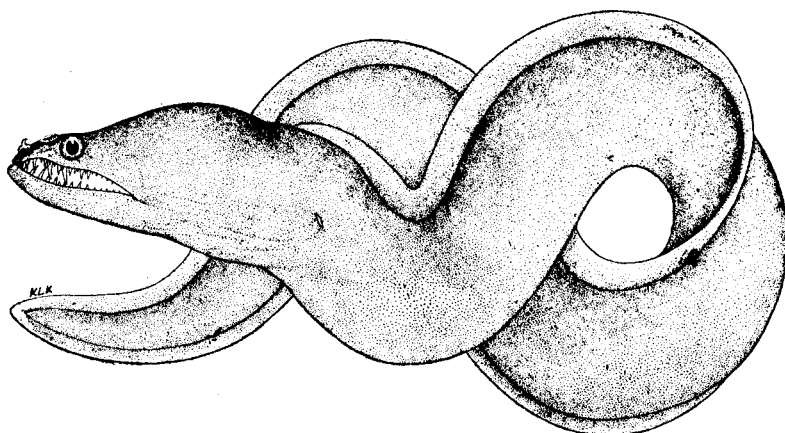


FIG. 67. *Enchelynassa canina* (Quoy and Gaimard), 890 mm.
(after Jones and Kumaran)

Specimens studied: Minicoy (2), 840 and 890 mm.

Head 7.3-7.5, depth of body 14.0-14.7, both in total length. Tail one fourth of length of head shorter than head and trunk. Eye 10.5-11.2 in head, 1.8-2.0 in snout and 1.3-1.4 in interorbital space. Anterior nostrils with a low rim and a curled bilobed flap behind. Posterior nostrils with elevated membranous rim, between anterior nostrils and eye, its diameter slightly less than eye. Cleft of mouth 2.1-2.2 in head. Origin of dorsal before a level from the gill openings. Two series of compressed teeth on the maxillary, the anterior-most small, the inner series large depressible fangs. A single series of teeth on the intermaxillary with two median depressible fangs. A single series of large teeth on the mandibles and an inner series of 3 large depressible fangs anteriorly. Two conical teeth on vomer. Colour: Uniform dark brown; dorsal and anal fins lighter posteriorly.

Local name: *Veng* (Minicoy).

Distribution: Mauritius, Laccadives, Indonesia, Samoa, Tahiti, Raiatea, Hawaii, Marshall Islands and Phoenix Islands.

68. *Gymnothorax buroensis* (Bleeker)

Muraena buroensis Bleeker, Nat. Tijds. Ned.-Ind., 13, p. 79, 1857.

Gymnothorax buroensis Schultz, Bull. U.S. Nat. Mus., 202, 1, p. 118, fig. 23, b. 1953.

Lycodontis buroensis Smith and Smith, Fishes of Seychelles, p. 57, pl. 41, D, 1963.

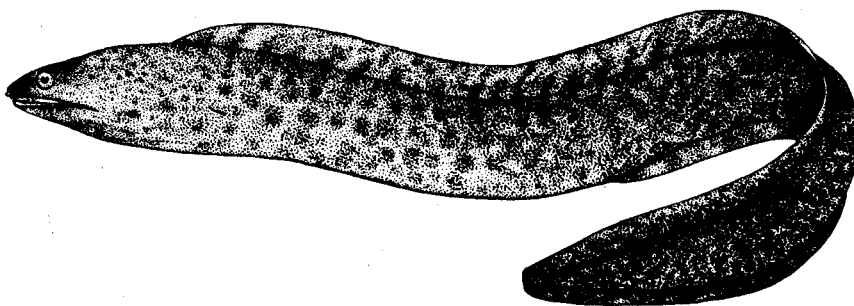


FIG. 68. *Gymnothorax buroensis* (Bleeker), 295 mm.

Specimens studied: Kavarathi (2), 220 and 295 mm.

Head 6.6-7.5, depth of body 12.5-13.5, both in total length. Head and trunk equal to or slightly longer than tail. Eye 8.0-9.5 in head, 1.5-1.6 in snout and 1.2-1.3 in interorbital space. Cleft of mouth 2.4-2.5 in head. Head 2.5-2.8 in trunk. Origin of dorsal on rear of head, midway between gill opening and rictus. Anterior nostril tubular, on each side of tip of snout, posterior nostril opposite front edge of eye, with slightly raised rims. Two series of teeth on maxillary, the outer row compressed and small and the inner series of 8-9 conical teeth. Intermaxillary with an outer series of compressed teeth and three inner rows of depressible caniniform teeth, the hind ones longest. A single row of teeth on vomer. A single series of compressed teeth, slightly inclined backwards on the mandible and 3-4 depressible caninoid teeth in an inner series anteriorly on each side. Colour: Dark brownish with numerous reticulated transverse black markings, those on the lower half of trunk breaking up into spots.

Local name: *Malanhi* (Kavarathi).

Distribution: South Africa and Seychelles to the Laccadives, Indonesia, Philippines, Samoan, Phoenix and Marshall and Marianas Islands.

69. *Gymnothorax richardsoni* (Bleeker)

Muraena richardsoni Bleeker, Nat. Tijds. Ned.-Ind., 3, p. 296, 1852.

Gymnothorax richardsoni Bleeker, Atlas, Ichth., 4, p. 100, pl. 42, fig. 2, 1864. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/48).

Lycodontis richardsoni Smith, Ichth. Bull., 23, p. 438, pl. 59, C, 1962.

Muraena (*Gymnothorax*) *richardsoni* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 383, fig. 189, 1916.

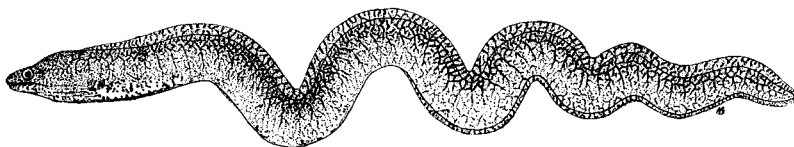


FIG. 69. *Gymnothorax richardsoni* (Bleeker), 172 mm.

Specimens studied: Kavarathi (5), 82 to 183 mm. Minicoy (1), 172 mm.

Head 7.6-8.2, depth of body 17.5-18.6, both in total length. Head and trunk as long as tail. Head about 2.8-3.0 in trunk. Eye 8.2-9.0 in head, 1.3-1.4 in snout and equal to interorbital space. Anterior nostrils tubular, on each side of tip of snout, hind nostrils above front border of eye with slightly raised rims. Cleft of mouth 2.7-2.9 in head. Dorsal origin before a vertical from the gill opening. Teeth in a single series in jaws, premaxillary with an inner series of 3 canines; maxillary with an inner row of 2-4 teeth; teeth on vomer biserial in front, uniserial behind. Colour: Yellowish grey with irregular and broken dark brown interconnecting bars on head, body and tail including fins; lower part of head and belly mottled with brown; lower jaw and upper lip more or less barred.

Local names: *Veng* (Minicoy). *Malanhi* (Kavarathi).

Distribution: East coast of Africa to Aldabra and Seychelles, Laccadives and from Indonesia to the Samoan, Fiji, Society, Hawaiian and Friendly Islands and Australia.

70. *Gymnothorax pictus* (Ahl)

Muraena picta Ahl, Dissert. de Muraena et Ophichtho, p. 6, pl. 2, fig. 2, 1789. Day, Fishes of India, p. 672, pl. 172, fig. 4, 1878.

Gymnothorax pictus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/49).

Muraena (*Gymnothorax*) *picta* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 363, figs. 175, 180, 182 and 183, 1916.

Sideria picta Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959. Smith, Ichth. Bull., 23, p. 440, pl. 61, A and B, 1962.

Specimens studied: Agathi (3), 108 to 535 mm. Ameni (1), 430 mm. Chetlat (3), 280 to 385 mm. Kavarathi (4), 165 to 300 mm. Kiltan (3), 565 to 725 mm. Minicoy (22), 95 to 680 mm.

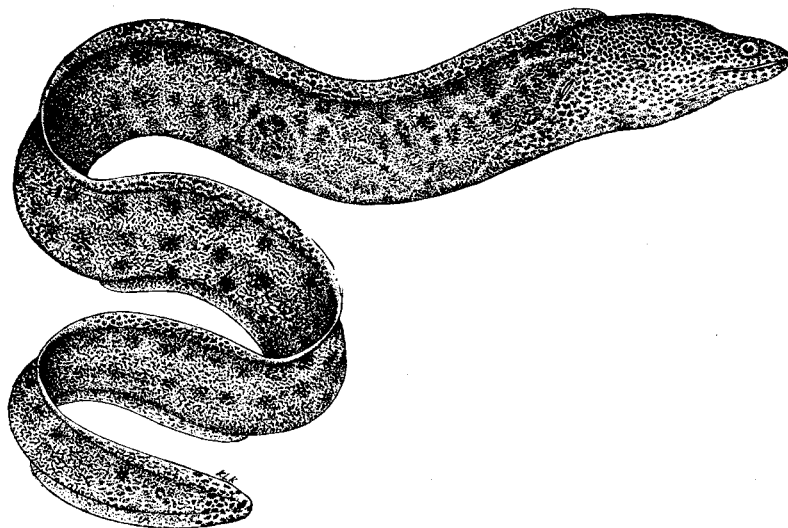


FIG. 70 a. *Gymnothorax pictus* (Ahl), 535 mm.

Head 6.6-8.0, depth of body 13.0-17.5, both in total length. Eye 9.0-13.2 in head, 1.4-2.0 in snout and 1.2-1.6 in interorbital space. Snout to rictus 2.6-3.2 in head. Tail 1.1-1.3 in head and trunk. Anterior nostrils tubular, on each side of tip of snout; posterior nostrils with raised rims, above anterior border of eye. Teeth all conical, on premaxillary 10-15 in number with an inner

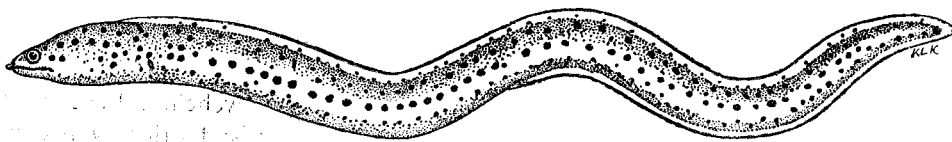


FIG. 70 b. *Gymnothorax pictus* (Ahl), 210 mm.

1-3 teeth not longer than those on premaxillary; vomerine teeth in 2 series, maxillary teeth in a single series; mandibular teeth in one row except anteriorly where it is double. Origin of dorsal over midway between rictus and gill opening. Colour: Background colour grey or light brownish grey above, white below; small black spots on head, body and tail except ventral surface in front of vent. In small specimens isolated black spots in 4-6 irregular longitudinal rows becoming ring shaped with yellowish centres and ultimately breaking up into smaller spots with age.

Local names: *Veng* (Minicoy). *Malanhi* (other islands).

Distribution: Widely distributed from the east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Ryukyu Islands, Australia and eastwards to the islands off the coast of Costa Rica and Mexico.

71. *Gymnothorax monostigmus* (Regan)

Muraena monostigma Regan, Ann. Mag. Nat. Hist., Ser. (8) 4, p. 438, 1909.

Gymnothorax monostigmus Schultz, Bull. U.S. Nat. Mus., 202, 1, p. 126, fig. 27, C, 1953.

Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 384, fig. 5, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/50).

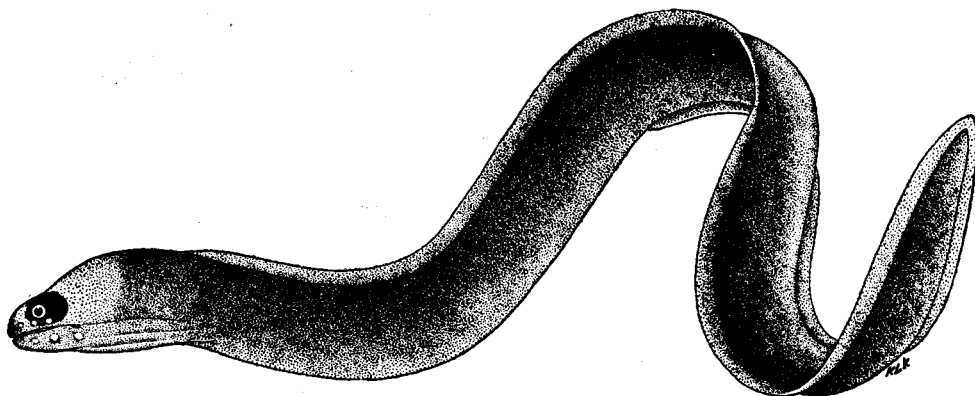


FIG. 71. *Gymnothorax monostigmus* (Regan), 338 mm.

Specimens studied: Kavarathi (1), 338 mm. Minicoy (2), 522 and 573 mm.

Head 8.1-8.3, depth of body 15.4-16.2, both in total length. Tail about half length of head shorter than head and trunk. Eye 11-12 in head, about 1.8-1.9 in bluntly rounded snout and 1.6-1.7 in interorbital space. Anterior nasal tubes short on each side of tip of snout; posterior nostrils with raised rims, above anterior border of eye. Teeth in one series in jaws, those near the symphysis of upper jaw canines; 2 mesial fang like teeth on premaxillary; maxillary with an inner row of 2 teeth; one series of short teeth on vomer. Dorsal origin above or slightly anterior to a level from gill opening. Skin very rough. Colour: Plain brown, slightly lighter below; eye in a rectangular deep black blotch extending about one eye diameter behind eye; 4 mucus pores on side of lower jaw and 3 on side of upper jaw and posterior nostril situated in white spot; median fins edged broadly whitish posteriorly.

Local names: *Kilouveng* (Minicoy). *Malanhi* (Kavarathi).

Distribution: So far known only from Laccadives in the Indian Ocean and Marshall and Society Islands in the Pacific.

72. *Gymnothorax pseudothyrsoides* (Bleeker)

Muraena pseudothyrsoides Bleeker, Nat. Tijds. Ned.-Ind., 3, p. 778, 1852.

? *Muraena pseudothyrsoides* Day, Fishes of India, p. 670, pl. 173, fig. 3, 1878.

Muraena (Gymnothorax) pseudothyrsoides Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 384, 1916.

Gymnothorax pseudothyrsoides Munro, Fishes of Ceylon, p. 62, pl. 11, fig. 172, 1955.

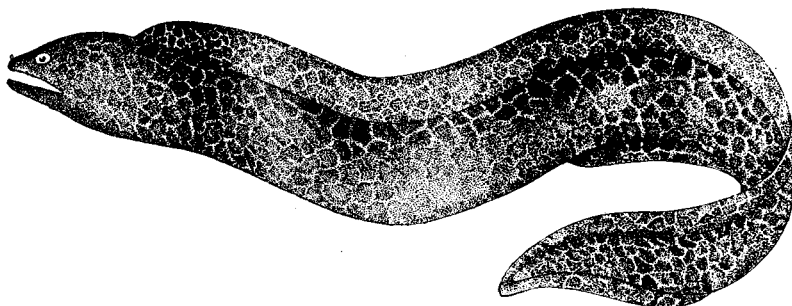


FIG. 72. *Gymnothorax pseudothyrsoides* (Bleeker), 870 mm.

Head 7-8, depth of body 14-20, both in total length. Head 2.5-2.9 in trunk. Eye nearer to tip of snout than to angle of mouth, 8-12 in head, 1.7-2.0 in head and about 1.4 in interorbital space. Cleft of mouth 2.1-2.3 in head. Origin of dorsal before a level from gill openings. A single series of compressed teeth on maxillary; a series of 10-12 teeth on intermaxillary and 3 mesial canines; a single series of teeth on mandible except at symphysis where teeth are irregularly biserial; a single series of teeth on vomer. Colour: Uniform brown or brownish, reticulated with white or yellow lines.

Note: Alcock (A naturalist in Indian Seas, 1902) mentions about the aggressive behaviour of this species he observed at Bitra in the Laccadives. The description is based on Weber and de Beaufort (1916).

Distribution: Arabia and Zanzibar to the Chagos Archipelago, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Taiwan, and Queensland.

73. *Gymnothorax monochrous* Bleeker

Gymnothorax monochrous Bleeker, Atlas Ichth., 4, p. 106, pl. 47, fig. 2, 1864. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/512).

Gymnothorax boschi Munro, Fishes of Ceylon, p. 62, pl. 11, fig. 169, 1955 (not of Bleeker).

Lycodontis monochrous Smith, Ichth. Bull., 23, p. 437, pl. 61, D, 1962.

Muraena (Gymnothorax) boschi Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 386, 1916 (not of Bleeker, in part).

Specimens studied: Minicoy (2), 160 and 195 mm.

Head 7.9-8.1, depth of body 22.0-22.5, both in total length. Head and trunk 1.4-1.45 in tail. Head 2.0-2.2 in trunk. Eye 11.5-12.0 in head and 2.5-2.7 in pointed snout. Tip of snout to rictus about 2.4 in head. A single series of conical teeth in upper jaw and 2-3 fangs on each side within and a row of

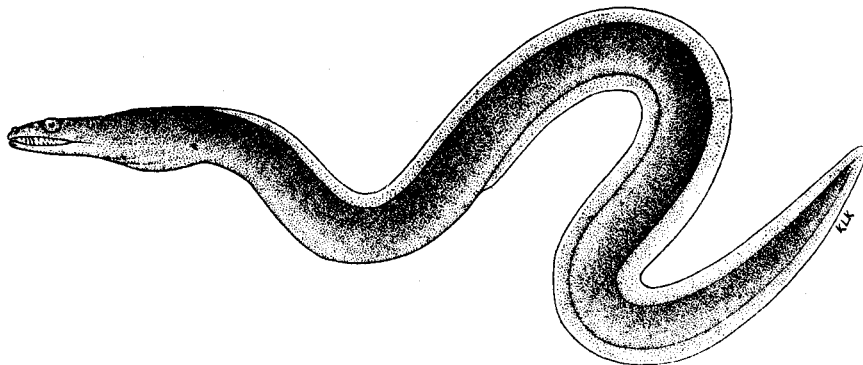


FIG. 73. *Gymnathorax monochrous* Bleeker, 160 mm.

3 larger canines on intermaxillary. Mandibles with a single series of teeth. Vomerine teeth uniserial. Front nostril tubular on each side of tip of snout; hind nostril a plain slit just above front edge of eye. Dorsal origin before a level from the gill openings. Colour: Uniform light brown; margin of dorsal slightly lighter.

Local name: *Veng* (Minicoy).

Distribution: East coast of South Africa, Laccadives, Ceylon, Malaysia, Indonesia, Philippines, Marshall and Marianas Islands.

74. *Gymnathorax javanicus* (Bleeker)

Muraena javanica Bleeker, Nat. Tijds. Ned.-Ind., 19, p. 347, 1859.

Gymnathorax javanicus Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 383, fig. 4, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA.F. 38/51).

Lycodontis javanicus Smith, Ichth. Bull., 23, p. 436, pl. 62, A, 1962.

Muraena (*Gymnathorax*) *flavimarginata* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 374, 1916 (synonymy only, in part).

Specimen studied: Agathi (1), 1225 mm.

Head 8, depth of body 11, both in total length. Head about 2.8 in trunk, head and trunk slightly longer than tail. Eye nearer to tip of snout than to corner of mouth, about 14.5 in head, 2.4 in snout and 2 in interorbital space. Cleft of mouth 2.3 in head. Anterior nostril in a short tube, posterior nostril with slightly raised rim. Mouth can be completely shut. Teeth uniserial, 18-19

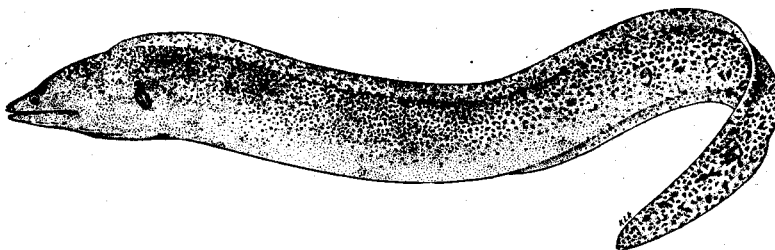


FIG. 74. *Gymnothorax javanicus* (Bleeker), 1225 mm.
(after Jones and Kumaran)

on side of each jaw, premaxillary with 2 inner median fang-like teeth, vomerine band of teeth short and bifurcated anteriorly. Gill opening about $1\frac{1}{2}$ of eye diameter. Dorsal moderately high, its origin on rear of head about equidistant between rictus and gill opening. Colour: Brownish, lower sides of belly lighter. Numerous black spots on head, trunk and tail excepting lower sides of head and belly, spots on head smaller. Gill opening in a black blotch. Corner of mouth dark.

Note: The dentition in the specimen described above is closer to *Gymnothorax javanicus* than to *G. flavimarginatus*. The general colour pattern reported for this species is light brown to bluish brown with black blotches and spots separated by pale interspaces; corner of mouth blackish and gill opening black. The difference in colour of the specimen described above is presumably only on account of its large size.

Local name: *Karimalanhi* (Agathi).

Distribution: Recorded from the Red Sea and east coast of South Africa and some of the neighbouring islands, Laccadives, Indonesia and Marshall Islands.

75. *Gymnothorax flavimarginatus* (Rüppell)

Muraena flavimarginata Rüppell, Atlas Reise Nördl. Afrika, Fische Rothen Meeres, p. 119, pl. 30, fig. 3, 1828. Day, Fishes of India, p. 671, 1878 (in part).

Gymnothorax flavimarginatus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/52).

Lycodontis flavimarginatus Smith, Ichth. Bull., 23, p. 435, pl. 59, A, 1962.

Lycodontis lemayi Smith, Fishes of Southern Africa, p. 510, pl. 99, fig. 1129 a, 1949.

Muraena (Gymnothorax) flavimarginata Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 374, 1916 (in part).

Specimens studied: Agathi (3), 212 to 320 mm. Bitra (10), 120 to 278 mm. Chetlat (18), 213 to 268 mm. Kalpeni (1), 180 mm. Kiltan (6), 108 to 175 mm. Minicoy (3), 115 to 228 mm.

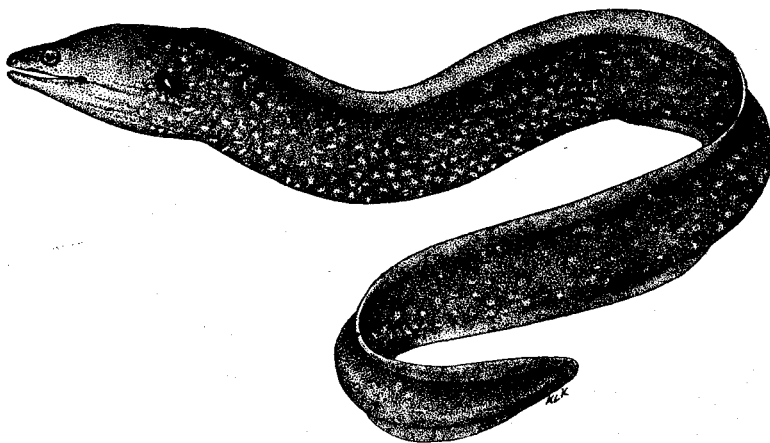


FIG. 75. *Gymnothorax flavimarginatus* (Rüppell), 320 mm.

Head 8.0-9.2, depth of body 14.8-17.5, both in total length. Tail equal to or about $\frac{1}{2}$ length of head longer than head and trunk. Head 2.9-3.4 in trunk. Eye 8.3-10.4 in head, 1.4-1.7 in snout and 1.1-1.4 in interorbital space. Anterior nostrils tubular, on each side of tip of snout, posterior nostrils above anterior edge of eye, with slightly raised rims. Cleft of mouth 2.2-2.5 in head. Teeth in single series in jaws, those near the symphysis longer than others; maxillary with an inner row of 2-3 teeth; premaxillary with a median series of 2-3 fang like teeth; vomer with 2 irregular series of small teeth. Dorsal origin nearer to gill opening than to corner of mouth. Colour: Highly variable; generally brown to blackish, densely mottled with light brown to whitish spots. Colouration sometimes consisting of very small indistinct dark brown spots which may fuse to form larger irregular patches. Median fins narrowly edged with white posteriorly; corner of mouth often dark; gill opening always in a dark brown or black blotch.

Local names: *Kaluveng* (Minicoy). *Karimalanhi* (other islands).

Distribution: Widespread from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines and Ryukyu, Palau and Hawaiian Islands.

76. *Gymnothorax fimbriatus* (Bennett)

Muraena fimbriata Bennett, Proc. Zool. Soc. London, 1, p. 168, 1831. Day, Fishes of India, p. 670, pl. 172, fig. 1, 1878.

Gymnothorax fimbriatus Munro, Fishes of Ceylon, p. 63, pl. 12, fig. 174, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 38/53).

Muraena (Gymnothorax) undulata Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 376, fig. 186, 1916 (not of Lacepede, synonymy in part).

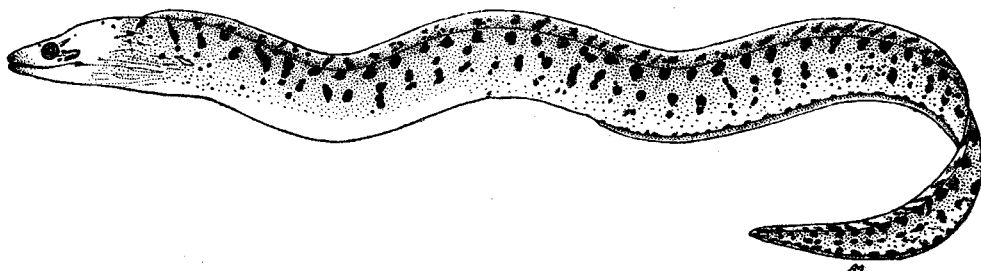


FIG. 76. *Gymnothorax fimbriatus* (Bennett), 265 mm.

Specimens studied: Chetlat (6), 72 to 218 mm. Kalpeni (1), 265 mm. Kiltan (3), 160 to 180 mm. Minicoy (11), 98 to 590 mm.

Head 7.2-8.0, depth of body 16.8-18.6, both in total length. Tail longer than head and trunk by about half length of head. Eye 8.2-9.5 in head, 1.6-1.8 in snout and 1.0-1.3 in interorbital space. Anterior nostrils tubular on either side of tip of snout, posterior nostrils over front edge of eye with slightly raised rim. Premaxillaries with a single series of teeth, those near symphysis larger than those of the maxillaries and with a median series of 2 or 3 fang like teeth, teeth on maxillaries in a single series; teeth on mandible in a single series, those near symphysis larger than others; teeth on vomer in a single irregular series. Dorsal origin nearer to gill opening than to rictus. Colour: Pale yellowish with a few small black spots on head; trunk and tail with irregular rows of black spots not larger than eye; black bars on fins extend obliquely backward and outward; tip of snout and tip of lower jaw brownish; dorsal and anal often with a light border.

Local names: *Veng* (Minicoy). *Malanhi* (other islands).

Distribution: East coast of South Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Marshall, Solomon and Samoan Islands.

77. *Gymnothorax ruppelli* (McClelland)

Dalophis rupelliae McClelland, Calcutta Jour. Nat. Hist., 5, p. 213, 1845.

Gymnothorax ruppelli Munro, Fishes of Ceylon, p. 62, pl. 11, fig. 170, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 38/54).

Lycodontis ruppelli Smith, Ichth., Bull., 23, p. 434, pl. 58, C, 1962.

Muraena Ruppelli Day, Fishes of India, p. 669, 1878.

Muraena (Gymnothorax) ruppelli Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 372, 1916.

Specimens studied: Kadamat (3), 125 to 143 mm. Minicoy (1), 137 mm.

Head 8.0-8.5, depth of body about 18.0-19.5, both in total length. Tail about $\frac{4}{5}$ head length longer than head and trunk. Head 2.5-2.6 in trunk. Eye 8.5-9.5 in head, about 1.5 in snout and equal to interorbital space. Cleft of

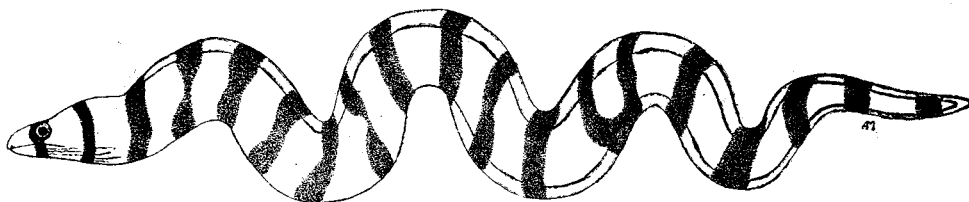


FIG. 77. *Gymnothorax ruppelli* (McClelland), 137 mm.

mouth 2.7-2.8 in head. Dorsal origin anterior to a level from the gill openings. Anterior nostrils tubular, on each side of tip of snout; posterior nostrils above anterior border of eye, with slightly raised rim. Premaxillary with a single series of teeth, two median depressible fangs; maxillary with a single series of conical compressed teeth and two inner teeth anteriorly; mandible with a single series of teeth. Vomer with a row of 8 small teeth. Colour: Yellowish white with 16-20 black rings, completely encircling head, body and fins, rings much narrower than ground colour; first ring across eye, the second behind corner of mouth and the third just across or just in front of gill openings, black rings extend to edges of dorsal and anal.

Local name: *Galiveng* (Minicoy).

Distribution: Red Sea, Seychelles and Aldabra to the Laccadives, coasts of India and Ceylon, Andamans, Indonesia, Philippines and Marianas, Marshall, Gilbert, Samoan and Tuamotu Islands.

78. *Gymnothorax petelli* (Ebleker)

Muraena petelli Bleeker, Nat. Tijds. Ned.-Ind., **11**, p. 84, 1856.

Gymnothorax petelli Jones and Kumaran, J. Mar. biol. Ass. India, **7**, p. 385, fig. 6, 1965.

Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 5, 1969 (Cat. No. CMFRI-LA-F. 38/55).

Lycodontis petelli Smith, Ichth. Bull., **23**, p. 435, pl. 58, B, 1962.

Muraena (*Gymnothorax*) *petelli* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **3**, p. 372, 1916.

Specimens studied: Bitra (13), 107 to 373 mm. Chetlat (11), 105 to 338 mm. Kavarathi (2), 118 to 353 mm. Kiltan (3), 130 to 145 mm. Minicoy (7), 55 to 384 mm.

Head 8.0-9.2, depth of body 14.8-18.7, both in total length. Tail equal to or nearly $\frac{3}{5}$ head longer than head and trunk. Head 2.4-3.0 in trunk. Eye 8.6-10.0 in head, 1.5-1.8 in snout and 1.0-1.2 in interorbital space. Cleft of mouth 2.1-2.5 in head. Anterior nostrils tubular, on each side of tip of snout; posterior nostril with slightly raised rim, above anterior edge of eye. Premaxillary with a single series of long teeth and 2-3 large median depressible fangs;

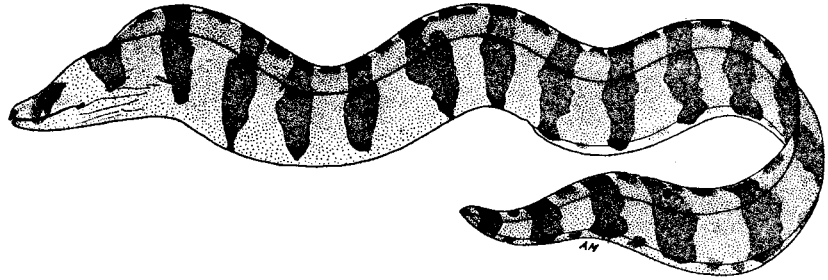


FIG. 78. *Gymnothorax petelli* (Bleeker), 384 mm.
(after Jones and Kumaran)

maxillary with a series of conical compressed teeth and often with an inner series of 2-3 long teeth anteriorly; mandible with a single series of teeth, those near symphysis longer than others; vomer with a series of 3-4 conical teeth. Dorsal origin before a level from the gill openings. Colour: Ground colour yellowish in juveniles, pale brownish in adults, with 17-21 dark brown cross bands; bands as wide as interspaces in juveniles, broader than interspaces in adults, first band through eye not reaching lower jaw, the second band from origin of dorsal, the third band from dorsal through gill opening or just behind it, some of the bands before vent not meeting ventrally, black rings not extending to edges of fins posteriorly; pale interspaces on fins often with brownish areas; a dark brown spot at corner of mouth.

Local names: *Galiveng* (Minicoy). *Varian-malanhi* (other islands).

Distribution: Red Sea, east coast of Africa and neighbouring islands to the Laccadives, Indonesia, Philippines and Ryukyu, Marshall, Hawaiian and Samoan Islands.

79. *Gymnothorax undulatus* (Lacépède)

Muraenophis undulata Lacépède, Hist. Nat. Poissons, 5, pp. 229 and 644, pl. 64, fig. 2, 1803.

Gymnothorax undulatus Munro, Fishes of Ceylon, p. 62, pl. 11, fig. 173, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 38/56).

Lycodontis undulatus Smith, Ichth. Bull., 23, p. 439, pl. 57, A to E, 1962 (synonymy in part).

Muraena undulata Day, Fishes of India, p. 671, pl. 171, fig. 5 and pl. 173, fig. 2, 1878.

Muraena (*Gymnothorax*) *undulata* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 376, 1916 (in part).

Specimens studied: Kavarathi (1), 212 mm. Minicoy (8), 197 to 350 mm.

Head 6.8-7.6, depth of body 13.5-18.5, both in total length. Tail half length of head longer than head and trunk. Eye 8.8-11.2 in head, 1.4-1.7 in snout and 1.1-1.3 in interorbital space. Head 2.1-2.6 in trunk. Cleft of mouth 2.3-2.8 in head. Anterior nostrils tubular, on either side of tip of snout, posterior nostrils without raised rims, above front border of eye. A single series of teeth in jaws, those near the symphysis much longer than others; 2-3 fangs in the middle of premaxillaries; maxillaries often with an inner row of 2-3 teeth; vomer with a single series of short teeth. Dorsal origin on rear of head, midway between rictus and gill opening. Colour: Head, body and fins covered with very large light brownish to brown blotches or vertical bars separated by narrow whitish interspaces, more or less interconnecting; corner of mouth often brownish, lower sides of head and thorax pale brownish. Large adults light brownish with irregularly sized dark blotches. Mucus pores on lower jaw and upper jaw white in small specimens.

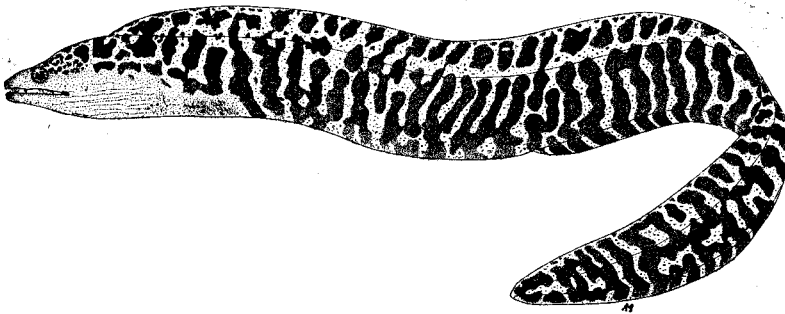


FIG. 79. *Gymnothorax undulatus* (Lacépède), 350 mm.

Local names: *Mudiveng* (Minicoy). *Kadukkamalanhi* (Kavarathi).

Distribution: Red Sea, east coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Japan, south to Australia, east to Marshall, Tahiti, Marquesas and Hawaiian Islands.

80. *Gymnothorax permistus* (Smith)

Muraena favaginea Kaup, Cat. Apodal Fish. British Mus., p. 68, fig. 53, 1856 (not of Bloch and Schneider).

Gymnothorax isingteena Bleeker, Atlas. Ichth., 4, p. 92, pl. 37, fig. 1, 1864 (not of Richardson).

Gymnothorax permistus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/57).

Lycodontis favagineus Smith, Fishes of Southern Africa, p. 398, fig. 1127, 1949 (not of Bloch and Schneider).

Lycodontis permistus Smith, Ichth. Bull., 23, p. 433, pl. 55, A and B, 1962.

Muraena (*Gymnothorax*) *favaginea* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 378, fig. 187, 1916 (not of Bloch and Schneider).

Specimen studied: Kavarathi (1), 370 mm.

Head 8.3, depth of body 18.6, both in total length. Tail slightly longer than head and trunk. Head 2.8 in trunk. Eye 11.5 in head, about 1.9 in snout and 1.6 in interorbital space. Cleft of mouth about 2.8 in head. Anterior nostrils tubular, on either side of tip of snout, posterior nostrils above anterior border of eye with very low rim. Premaxillary with 5 long teeth on each side and 3 larger depressible canines mesially. Maxillary with 12-13 small conical teeth on each side. Mandible with a single series of 16-17 conical teeth on each side, those near the symphysis much larger than others. Single series of short conical teeth on vomer. Origin of dorsal midway between rictus and gill opening. Colour: Head, body and fins with large more or less polygonal black blotches separated by narrow yellowish white interspaces.

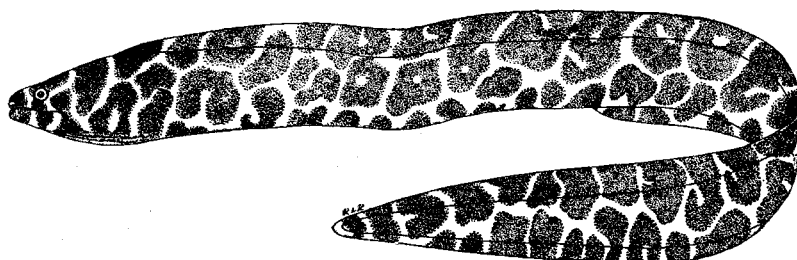


FIG. 80. *Gymnothorax permistus* (Smith), 370 mm.

Local name: *Kallimalanhi* (Kavarathi).

Distribution: East coast of South Africa and neighbouring islands, Laccadives, India, Indonesia and likely extending to the islands of the Eastern Pacific.

81. *Uropterygius marmoratus* (Lacépède)

Gymnomuraena marmorata Lacépède, Hist. Nat. Poissons, 5, p. 648, 1803. Day, Fishes of India, p. 674, pl. 172, fig. 5, 1878 (synonymy in part). Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, 397, figs. 193 and 194, 1916.

Uropterygius marmoratus Munro, Fishes of Ceylon, p. 61, pl. 11, fig. 165, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959. Smith, Ichth. Bull., 23, p. 427, pl. 53, D, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 38/58).

Specimens studied: Bitra (2), 240 and 535 mm. Kiltan (3), 425 to 465 mm. Minicoy (5), 215 to 605 mm.

Head 9.2-11.5, depth of body 18.6-23.3, both in total length. Tail $\frac{1}{2}$ to $1\frac{1}{2}$ length of head longer than head and trunk. Head 3.0-3.8 in trunk. Eye 12-18 in head, 1.8-2.6 in snout and 1.6-2.0 in interorbital space. Cleft of mouth 2.4 to nearly 3 in head. Anterior nostrils tubular, on each side of tip of snout;

posterior nostrils in a short tube, above a vertical from the anterior border of pupil. Teeth in jaws in 3 rows, the marginal series of numerous small close set teeth, the two inner series with fewer, longer and depressible teeth; the maxillary encloses numerous longer and depressible teeth; vomerine teeth long, biserial anteriorly, uniserial posteriorly. Colour: Yellowish to brownish grey, lighter on lower sides of head and trunk; everywhere marbled or with spots of brown, olive and blackish.

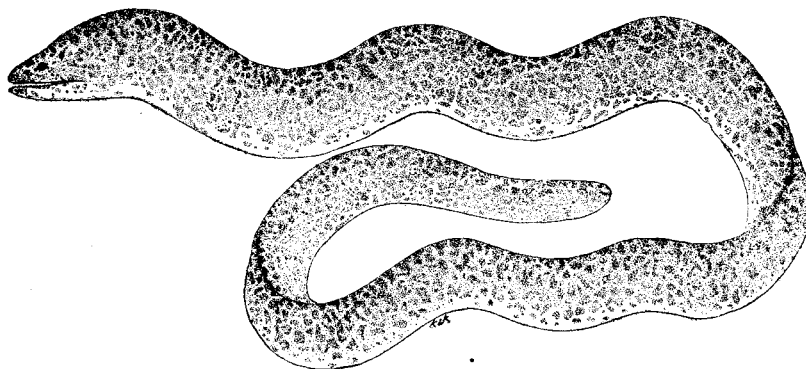


FIG. 81. *Uropterygius marmoratus* (Lacépède), 605 mm.
(after Jones and Kumaran)

Local names: *Lafiveng* (Minicoy). *Malanhi* (other islands).

Distribution: From the east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines and eastwards to Marshall, Hawaiian and Marquesas Islands.

82. *Anarchias cantonensis* (Schultz)

Uropterygius cantonensis Schultz, Bull. U.S. Nat. Mus., 180, p. 27, pl. 4, fig. 3 a, 1943.
Anarchias cantonensis Schultz, Bull. U.S. Nat. Mus., 202, 1, p. 146, pl. 15 and fig. 29 a, 1953. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 381, fig. 1, 1965. Jones Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/59).

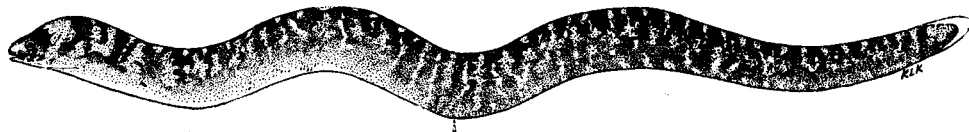


FIG. 82. *Anarchias cantonensis* (Schultz), 120 mm.
(after Jones and Kumaran)

Specimens studied: Agathi (5), 98 to 125 mm. Kavarathi (3), 103 to 117 mm. Kiltan (3), 103 to 118 mm. Minicoy (3), 120 to 136 mm.

Head 7.3-7.9, depth of body 16.4-20.4, both in total length. Head 2.2-2.6 in trunk. Head and trunk 2.1-2.25 in total length. Eye 1.6-2.2 in snout which is about 6 in head. Snout to rictus 3.0-3.3 in head. Nape descends abruptly. Anterior nostrils short, tubular, on each side of tip of snout; 2 posterior nasal openings close together over each eye opposite hind half of pupil. Teeth in jaws in two rows, the upper inner series 5-6 canine like; 2 depressible fangs on intermaxillary with 3 slightly smaller teeth on each side; vomerine teeth uniserial. Dorsal and anal fins reduced to rudiments and confluent with caudal fin. Colour: Pale, with irregular vertical reticulated brownish bars on sides, clearly visible behind vent; lower side of head and abdomen pale; lips in some specimens barred; mucus pores on head white; caudal fin whitish.

Distribution: Known only from the Laccadives in the Indian Ocean and Marshall and Phoenix Islands in the Pacific.

Note: According to Schultz *A. cantonensis* has 7 teeth in an inner series in the maxillary. In the specimens examined by us, there are 5 or 6 teeth in the inner series and this difference is considered only as a variation. The specimens from the Laccadives differ from *A. seychellensis* Smith, a closely related species in the western Indian Ocean in the abrupt profile of nape and in having a short tail (1.1-1.25 and 1.25-1.4 as long as rest of body in *cantonensis* and *seychellensis* respectively) and slightly large head (7.3-7.9 and about 9 in total length in *cantonensis* and *seychellensis* respectively).

83. *Anarchias fuscus* Smith

Anarchias fuscus Smith, Ichth. Bull., 23, p. 428, pl. 53, G and fig. 5, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 382, fig. 2, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 38/60).

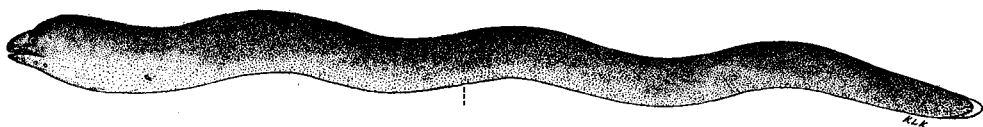


FIG. 83. *Anarchias fuscus* Smith, 133 mm. (after Jones and Kumaran)

Specimens studied: Chetlat (6), 114 to 124 mm. Kadamat (3), 90 to 122 mm. Kalpeni (4), 88 to 149 mm. Kavarathi (1), 107 mm. Minicoy (3), 114 to 133 mm.

Head 7-8, depth of body 15.6-18.8, both in total length. Head 2.4-2.7 in trunk. Head and trunk 2.1-2.2 in total length. Eye 1.8-2.3 in snout which is 6.2-6.6 in head. Snout to rictus 3.2-3.5 in head. Nape descending abruptly. Anterior nostrils short, tubular, reaching tip of snout; posterior nostrils of 2 pores over eye. Teeth in 2 series in jaws; the upper inner series of 3-5 teeth canine like; 2 depressible fangs on intermaxillary with 2-3 slightly smaller teeth

on each side; vomerine teeth uniserial. Dorsal and anal fins rudimentary and confluent with caudal fin. Colour: Uniform dark brown, mucus pores on head lighter; caudal fin whitish.

Distribution: Known only from 6 specimens from Malindi, Delgado and Ibo on the east coast of Africa. Recently recorded from the Laccadives in the Central Indian Ocean.

Note: *A. allardicei* Jordan and Starks from the Pacific is similar to this species in body proportions and colouration. However, there is only one depressible fang on the intermaxillary in *A. allardicei* and hence *A. fuscus* is considered distinct.

Family MORINGUIDAE

Very elongate, cylindrical body. Dorsal and anal reduced to low folds, confined to the tail and confluent with caudal. Pectorals rudimentary or absent. Tail much shorter than body. Vent far behind middle of length. Jaws equal or the lower jaw slightly projecting. Teeth small, pointed, uniserial in jaws and on vomer. Gill openings small. Eyes small or almost hidden below the skin. Body naked. Anterior nostril tubular near end of snout; posterior nostril just in front of eye.

1. Dorsal and anal fins vestigial; their origins nearly opposite; dorsal and anal fins reduced to a very low fold not extending notably above the sides of the groove anteriorly; this membrane disappear and reappear just in front of the caudal fin with which they are confluent. Caudal rounded 2
Dorsal and anal fins with rayed anterior portion extending notably above the groove but disappear near middle part of its length and reappear as a rayed membrane near caudal fin with which they are confluent. Caudal fin truncate or spatulate 3
2. Depth 48-55 in total length. Tail 1.8-2.3 in head and trunk *Moringua abbreviata*
Depth 77-92 in total length. Tail 2.5-2.8 in head and trunk *Moringua javanica*
3. Dorsal fin origin about $\frac{1}{4}$ head length behind a vertical through anal origin. Pectoral about 15 in head *Moringua microchir*
Dorsal and anal fins beginning opposite each other. Back dusky to blackish. Pectoral 5.3-8.0 in head 4
4. Depth about 36, head 9.6 in total length; pectoral 5.3 in head. Anal fin origin half length of head behind vent *Moringua macrochir*
Depth about 52, head 14 in total length; pectoral about 8 in head. Anal fin origin one head length behind vent *Moringua bicolor*

84. *Moringua abbreviata* (Bleeker)

Aphthalmichthys abbreviatus Bleeker, Ned. Tijds. Dierk., 1, p. 163, 1863.

Moringua abbreviata Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 341, 1916. Schultz, Bull., U.S. Nat. Mus., 202, 1, p. 89, fig. 19, b and pl. 11, b, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 188/61).

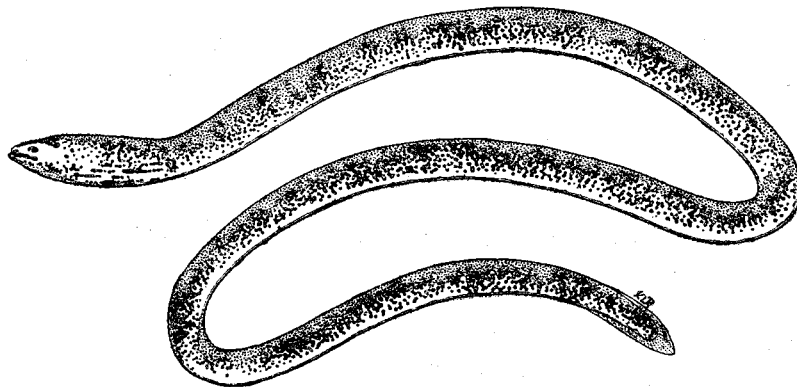


FIG 84. *Moringua abbreviata* (Bleeker), 255 mm.

Specimens studied: Agathi (3), 147 to 193 mm. Chetlat (24), 124 to 228 mm. Kadamat (7), 127 to 245 mm. Kalpeni (19), 146 to 255 mm. Kavarathi (45), 136 to 293 mm. Kiltan (8), 195 to 258 mm. Minicoy (48), 125 to 267 mm.

Head 13.0-15.8, depth of body 48 to 55, both in total length. Head 7.8-9.7 in trunk. Tail 1.8-2.3 in head and trunk. Cleft of mouth 4.6-5.3 in head, reaching behind hind border of eye which is very small and nearly hidden below the skin. Lower jaw projecting slightly beyond the upper. Anterior nostrils tubular, on side of snout near its front; posterior nostrils just in front of eye. Teeth short, pointed, in a single series in jaws and on vomer; those in front of jaws stouter. Pectoral fin rudimentary. Dorsal and anal vestigial, confined to the tail, in a shallow groove without rays and confluent with rayed caudal. Origin of dorsal and anal variable, generally about one to one and a quarter length of head posterior to vent. Caudal somewhat rounded. Colour: Orange yellow.

Local names: *Faniveng* (Minicoy). *Poonunna-malanhi* (other islands).

Distribution: Laccadives, Indonesia to the Philippines, Ryukyu, Marianas and Marshall Islands.

85. *Moringua javanica* (Kaup)

Aphthalmichthys javanicus Kaup, Cat. Apodal Fish. British Mus., p. 105, 1856.

Moringua javanica Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 342, fig. 164, 1916. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 187, fig. 1 a, 1970.

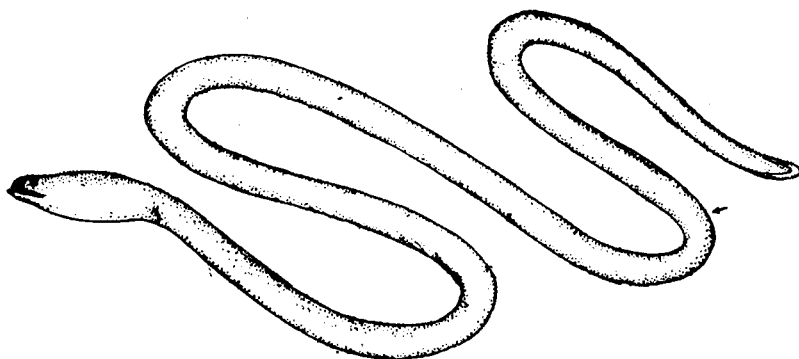


FIG. 85. *Moringua javanica* (Kaup), 770 mm. (after Jones and Kumaran)

Specimens studied: Agathi (4), 448 to 770 mm.

Body extremely elongate, cylindrical. Head 16.0-17.2, depth of body 77-92, both in total length. Head 11.2-11.7 in trunk. Tail 2.5-2.8 in head and trunk. Eye minute, 40-55 in head. Cleft of mouth 5.0-5.8 in head, reaching far behind hind border of eye. Lower jaw slightly longer than upper, projecting beyond tip of snout. Teeth conical, pointed, in a single series in jaws, the anterior three pairs in the upper jaw stouter and longer. 4-5 teeth on vomer. Anterior nostril tubular, on side of snout near front margin; posterior nostril just in front of eye with raised membraneous rim. Origin of anal fin 1.2-1.4 length of head behind vent. Origin of dorsal fin somewhat opposite to that of anal. Dorsal and anal vestigial, scarcely projecting above the sides of the groove, slightly more elevated in front of somewhat rounded caudal fin with which they are confluent. Pectorals rudimentary, smaller than eye. Colour: Pale yellowish, back slightly dusky.

Local name: *Poonunna-malanhi* (Agathi).

Distribution: Laccadives, Indonesia to the Philippines, Japan and Marshall and Hawaiian Islands.

86. *Moringua microchir* Bleeker

Moringua microchir Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 124, 1853. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 338, 1916. Smith and Smith, Fishes of Seychelles, p. 56, pl. 47, B, 1963.

Moringua javanica Smith, Fishes of Southern Africa, p. 508, fig. 1094 a, pl. 100, fig. 1094 a, 1961 (not of Kaup).

Specimen studied: Agathi (1), 244 mm.

Body elongate, cylindrical. Head 13.5, depth of body 45, both in total length. Head 8.2 in trunk. Tail about 2.2 in head and trunk. Eye about 20 in head and about thrice in snout. Cleft of mouth 4.5 in head, reaching behind hind border of eye. Lower jaw projecting slightly beyond tip of snout. Anterior nostril tubular, on side of snout near its front margin; hind nostril an open pore, just in front of eye. A single series of 12 small conical teeth in each



FIG. 86. *Moringua microchir* Bleeker, 244 mm.

mandible, six conical teeth in each maxillary, 3 pairs of slightly stouter teeth on the intermaxillary and 5 small teeth on vomer. Dorsal and anal low, anteriorly and posteriorly with distinct rays, middle membranous portion rudimentary. Dorsal and anal fins confluent with caudal fin; obtusely rounded. Pectoral very short, about equal to eye; base of pectoral fin extending a little over halfway down gill opening. Colour: Uniform yellowish.

Local name: *Poonunna-malanhi* (Agathi).

Distribution: East coast of South Africa, Seychelles, Laccadives and from Indonesia to the Philippines, Fiji, Marquesas and New Guinea.

87. *Moringua macrochir* Bleeker

Moringua macrochir Bleeker, Nat. Tijds. Ned.-Ind., 9, p. 71, 1855. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 339, fig. 166, 1916. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 188/62).



FIG. 87. *Moringua macrochir* Bleeker, 210 mm.

Specimen studied: Minicoy (1), 210 mm.

Head 9.6, depth of body 36, both in total length. Head 5.5 in trunk. Tail a little more than two in head and trunk. Eye about 15 in head. Cleft of mouth about 4.8 in head, reaching below hind part of eye. Lower jaw prominent. Anterior nostril tubular, on side of snout near its front; posterior nostril

in front of eye with slightly raised rim. Teeth conical in a single series in jaws, teeth on intermaxillary and front four teeth on mandible stouter; a row of four small teeth on vomer. Pectoral about 5.3 in head. Anal fin about half length of head behind vent; dorsal origin about 0.8 head length behind a level from vent. Anterior portion of dorsal and anal rayed, interrupted in the middle and reappearing as rayed membrane in front of caudal and confluent with caudal which is truncate. Colour: Dusky grey on back, pale yellowish below.

Local name: *Faniveng* (Minicoy).

Distribution: Laccadives and from Indonesia to the Philippines, Marianas and Marshall Islands.

88. *Moringua bicolor* Kaup

Moringua bicolor Kaup, Cat. Apodal Fish. British Mus., p. 107, 1856. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 338, fig. 165, 1916.

Rataboura bicolor Munro, Fishes of Ceylon, p. 63, pl. 12, fig. 177, 1955.



FIG. 88. *Moringua bicolor* Kaup, 232 mm.

Specimen studied: Kavarathi (1), 232 mm.

Body extremely elongate, cylindrical. Head 14, depth of body 52, both in total length. Head 8.6 in trunk. Tail about 2.1 in head and trunk. Eye about 18 in head and 2.5 in snout. Cleft of mouth 4.6 in head, reaching to below hind border of eye. Lower jaw projecting beyond the upper. Anterior nostril tubular, on side of snout behind its front margin, hind nostril just in front of eye. Teeth conical, pointed, 8 in each mandible, 5 teeth in each maxillary, 3 pairs of stouter teeth on the intermaxillary and 3 on the vomer. Anal originating a head length behind anus. Dorsal origin slightly behind a vertical from that of anal. Anterior part of dorsal and anal with distinct rays, middle part of the fins rudimentary and reappearing again as a rayed membrane just in front of caudal and becoming confluent with the caudal; the latter projecting slightly beyond the dorsal and anal. Pectoral about 8 times in length of head, its base extending about $\frac{3}{4}$ of the way down gill opening. Colour: Dorsal half of body brownish, lower half pale yellowish. Fins yellowish white, united dorsal, caudal and anal basally dusky.

Distribution: Laccadives, Ceylon, Indonesia to the Philippines, Marshall and Fiji Islands and Bismarck Archipelago.

Family CONGRIDAE

Elongate, compressed. Vent in anterior half of length. Dorsal and anal well developed, confluent with tail. Cleft of mouth to slightly beyond eye. Teeth strong, in one or two series or in bands, differing in size and form. Anterior nostril often tubulate, close to end of snout; hind nostril close to eye. Gill openings moderate. Gill membranes attached to isthmus.

1. Anterior nostril not tubular. Depth 13-16. Interspace between gill openings greater than their width *Uroconger braueri*
 Anterior nostril tubular 2
2. Teeth in jaws equal and close together forming a cutting edge. Dorsal origin above middle of pectoral *Conger cinereus*
 Teeth in jaws not equal and not forming a cutting edge 3
3. Head much less than six in total length. Teeth in jaws in wide bands, mostly depressible *Xenomystax trucidans*
 Head equal to or more than six in total length. Teeth small, pointed .. 4
4. Eye 4.8-5.4 in head. Dorsal origin above base of pectorals. Pale brownish to lighter below *Ariosoma anago*
 Eye about 8 in head. Dorsal origin behind base of pectoral. Purple black *Ariosoma purpureus*

89. *Uroconger braueri* Weber and de Beaufort

Uroconger vicinus Alcock, Ann. Mag. Nat. Hist., (6) 10, p. 363, 1892 (not of Vaillant).

Uroconger braueri Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 266, 1916.

Bathyuroconger braueri Norman, John Murray Exped., 7, p. 40, fig. 13, 1939.

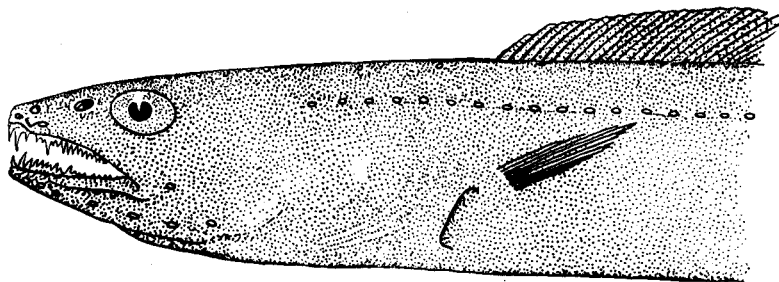


FIG. 89. *Uroconger braueri* Weber and de Beaufort. (after Norman)

Body elongate, subcylindrical anteriorly but increasingly depressed posteriorly. Head conical, 7.0-7.8, depth of body 13-16, both in total length. Head and trunk more than twice in tail. Eye 6.2-7.3 in head, about 1.8 in snout and slightly less than interorbital space. Anterior nostril close to end of snout;

hind nostril a little in front of upper part of eye. Cleft of mouth extending slightly behind middle of eye. Teeth in jaws in two irregular rows laterally, teeth of premaxillaries and in front of lower jaw caninoid; one or two caninoid teeth on the front of vomer with two or more smaller ones on sides. Interspace between gill openings greater than their width. Origin of dorsal above base of pectoral. Pectoral about $\frac{1}{3}$ length of head and with 15-17 rays. Colour: Brownish; ventral side bluish black.

Distribution: Deep waters off the east coast of Africa, Laccadive Sea, Maldiva area, Bay of Bengal and off the west coast of Sumatra.

90. *Conger cinereus* Rüppell

Conger cinereus Rüppell, Atlas Reise Nordl. Afrika, Fische Rothen Meeres, p. 115, pl. 29, fig. 1, 1828. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 258, figs. 107 and 108, 1916. Smith, Fishes of Southern Africa, p. 393, pl. 99, fig. 1111, 1949. Munro, Fishes of Ceylon, p. 64, pl. 11, fig. 179, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. CMFRI-LA-F. 41/63).

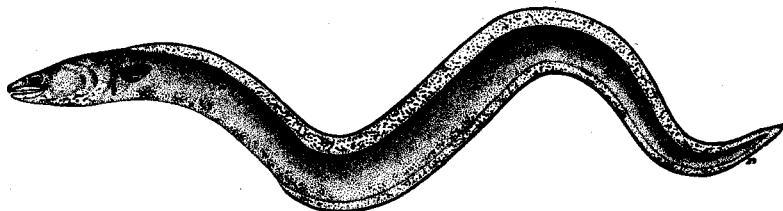


FIG. 90. *Conger cinereus* Rüppell, 655 mm.

Specimens studied: Kadamat (1), 268 mm. Kavarathi (2), 160 and 168 mm. Kiltan (3), 188 to 232 mm. Minicoy (2), 655 and 730 mm.

Head 8.0-8.4, depth of body 18.5-24.0, both in total length. Snout tip to vent 3.0-3.1 in total length. Eye 6.2-8.0 in head and 1.6-1.8 in snout which is 4.1-4.4 in head. Pectoral about 3 in head and with 17 rays. Anterior nostrils tubular, at each side of tip of snout; posterior nostrils a plain pore before eye and slightly below the level of its upper border. Teeth in jaws short and closely set in a single series to form a cutting edge except anteriorly where there are 2-4 irregular series; intermaxillary teeth in a roundish patch and a few teeth in a conical group on vomer. Origin of dorsal above the middle of pectorals; dorsal and anal high and confluent with caudal fin. Colour: Brown above, lighter to white ventrally; a dark streak below eye; dorsal and anal fins whitish and margined with a black band continuous around caudal fin. Pectoral white with a black blotch distally in large specimens. Dorsal and anal fins without black edge in small specimens.

Local names: *Musveng* (Minicoy). *Malang*, *Meen-malanhi* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, Ceylon, Indonesia, Philippines, Japan and to Marshall, Hawaiian, Samoan, Phoenix and Christmas Islands.

91. *Xenomystax trucidans* Alcock

Xenomystax trucidans Alcock, J. Asiat. Soc. Bengal, 63 (2), p. 134, 1894. Alcock, Illus. Zool. Investigator, pl. 16, fig. 5, 1895.

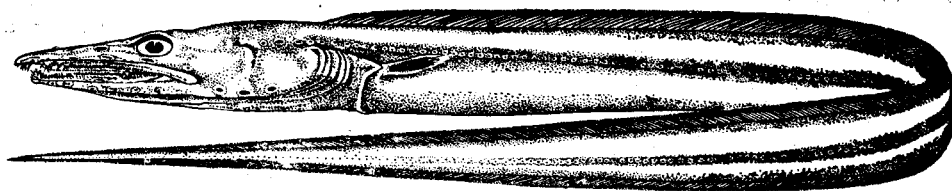


FIG. 91. *Xenomystax trucidans* Alcock. (after Alcock)

Head more than 4 in total length, trunk about 3.5 in tail. The depressed slender snout is a little more than one third of head in length and nearly four times the diameter of eye. Long slit-like mucus pores on the margin of upper jaw and a series of pores along mandible and preopercle. The anterior nostril is a long sub-tubular slit close to the tip of snout, the posterior is a wide elliptical foramen situated almost superiorly at the end of middle third of snout. Mouth wide, reaching about an eye diameter behind the eye. Hind end of maxillary nearer to the tip of gill opening than to the tip of snout. Teeth in jaws in wide bands, mostly depressible; maxillary teeth divided by a deep groove running entire length of the jaw, those on inner side of groove long, close set, in a single series; mandible with much narrower and shallower groove, the inner series small and directed inwards; tip of mandible enlarged and fits into an edentulous depression just behind head of vomer; teeth on head of vomer and knob of mandible slightly larger than those of the side of jaw. Gill openings wide, separated by a narrow interspace. Origin of dorsal fin just before a level from the gill openings. Pectoral narrow, more than half length of snout. Colour: Blue black; mucus pores of head, margin of gill opening and lateral line brilliant white; pectoral with a narrow whitish edge and tip.

Distribution: Laccadive Sea.

92. *Ariosoma anago* (Schlegel)

Conger anago Schlegel, Fauna Japonica Pisces, p. 259, pl. 113, fig. 1, 1846.

Ariosoma anago Smith, Fishes of Southern Africa, p. 393, fig. 1112, 1949. Munro, Fishes of Ceylon, p. 64, pl. 12, fig. 180, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 4, 1969 (Cat. No. OMFRI-LA-F. 41/63).

Congrellus anago Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 262, 1916.

Congromuraena anago Day, Fishes of India, p. 660, pl. 169, fig. 2, 1878.

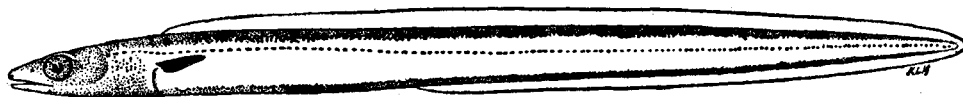


FIG. 92. *Ariosoma anago* (Schlegel), 210 mm.

Specimens studied: Kavarathi (3), 128 to 150 mm. Minicoy (8), 126 to 210 mm.

Head 6.0-6.6, depth of body 15.0-16.4, both in total length. Head 1.7-1.8 in trunk. Head and trunk 2.3-2.4 in total length. Eye large, covered by skin, 4.6-5.4 in head and 1.1-1.2 in blunt snout. Cleft of mouth reaching somewhat below middle of eye. Upper jaw slightly projecting beyond the lower. Anterior nostrils short, tubular, close to tip of snout; posterior nostrils in front of eye. Teeth small, pointed, maxillary in 2 or 3 series anteriorly, posteriorly in 1 or 2 series; intermaxillary teeth in a semilunar patch, vomerine teeth in a conical patch. Mandibles anteriorly with 4 or 5 irregular series and posteriorly with 1 or 2 series of teeth. Origin of dorsal above base of pectorals; dorsal and anal confluent with the short caudal. Pectoral 2.7 in head. Colour: Pale orange yellow or pale brownish to lighter below. Fins yellowish hyaline or pale.

Local name: *Musveng* (Minicoy).

Distribution: Coast of Natal, Laccadives, Coasts of India and Ceylon to Indonesia, north to Japan.

93. *Ariosoma purpureus* (Alcock)

Pormyllantor purpureus Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 310, 1890. Alcock, Illus. Zool. Investigator, pl. 6, fig. 2, 1892.

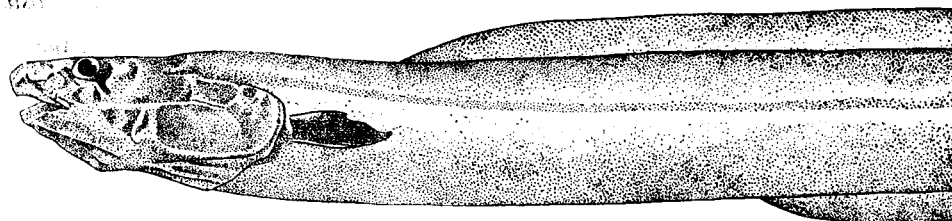


FIG. 93. *Ariosoma purpureus* (Alcock). (after Alcock)

Body moderately long, subcylindrical; tail slightly longer than head and trunk. Head 6 in total length. Depth of body equal to postorbital part of head.

Eye more than 8 in head and about twice in obtusely rounded snout. Anterior nostril tubular, inferiorly at tip of snout. Posterior nostril a plain pore just above anterior orbital angle. Numerous mucous cavities on head. Mouth subinferior, its angle reaching behind vertical through anterior border of eye. Villiform teeth in broad bands in jaws and in a broad confluent patch on palate. Dorsal origin just behind the level of pectorals. Origin of anal about 1.7 times head behind hind border of operculum. Dorsal and anal confluent with caudal. Pectorals small, pointed, equal to half length of postorbital part of head. Colour: Body and fins purple black.

Distribution: Laccadive Sea.

Family OPHICHTHYIDAE

Elongate vermiform body. Dorsal and anal well developed or rudimentary and ending before tip of tail which ends in a somewhat stiff point; caudal fin absent. Pectorals present, rudimentary or absent. Anterior nostril tubular on the border of upper lip or on the ventral surface of end of snout; posterior nostrils slit-like in the border of upper lip directed ventrally. Teeth pointed, conical or granular in one or more series in jaws. Gill openings lateral or sometimes ventral, vertical, oblique or longitudinal. Vent before or behind middle of length. Body naked.

1. Dorsal origin before gill openings 2
Dorsal fin above or behind gill openings 5
2. Pectorals absent. Teeth conical or canine like, in a single series in jaws, in one or two rows on vomer 3
Pectorals short, broad rudiments. Teeth granular, in two rows in jaws and on vomer 4
3. Tail 1.35 in head and trunk. Head mostly white; a broad band from head to tail not touching base of dorsal and broken up as brown spots behind head; corner of mouth with brown spot; dorsal with narrow dusky outer margin *Callechelys nebulosus*
Tail about 2.3 in head and trunk. Head with three transverse brown bands; a broad black band along upper part of body and tail; head with dusky spots; margin of dorsal fin black *Callechelys melanotaenia*
4. Dorsal and anal ending near tip of tail. Pale yellowish or white with two or three alternating series of black blotches, the upper series partly extending on to the dorsal fin *Myrichthys maculosus*
Anal ending before end of dorsal which is far from tip of tail. Yellowish white with 26-32 narrow dark brown rings which extend on to the base of dorsal and often to the base of anal *Myrichthys colubrinus*

5. No teeth on vomer; hind nostril in upper lip with a flap. Pale yellowish white with 25-31 dark brown cross bands extending to dorsal fin, but generally not meeting *Leiuranus semicinctus*
Teeth on vomer present 6
6. Teeth conical in a single series on sides of jaws. Brownish becoming pale yellowish below; front of dorsal about 2/3 length of head blackish; dorsal and anal with dark margin *Ophichthys altipinnis*
Teeth granular; in bands. Brownish yellow, lighter below
..... *Pisoodonophis cancrivorus*

94. *Callechelys nebulosus* Smith

Callechelys bitaeniatus Smith, Ann. Mag. Nat. Hist., (12) 10, p. 835, pl. 27, fig. D, 1957 (not of Peters).

Callechelys nebulosus Smith, Ichth. Bull., 24, p. 452, pl. 65, D, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 386, fig. 7, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 44/65).



FIG. 94. *Callechelys nebulosus* Smith, 236 mm.
(after Jones and Kumaran)

Specimen studied: Chetlat (1), 236 mm.

Head about 15, depth of body about 45, both in total length. Head about 7.6 in trunk. Tail 1.35 in head and trunk. Tip of snout to rictus about 3.5 in head. Eye about 2 in snout and more than 15 in head. Snout projecting beyond tip of lower jaw, dorsal surface of snout strongly convex. Gill openings small oblique slits. Front nostrils short, tubular, near tip of snout; posterior nostrils in upper lip under eye, directed downwards. Several pores on head, of which two on chin behind angle of mouth edged dark. Small conical teeth in a single series in jaws. Dorsal origin on head slightly behind a level from the angle of mouth. Dorsal and anal low, about 1/3 of body depth and ending before tip of tail; caudal absent. Pectorals absent. Colour: Pale, front half of head mostly white, a broad brown band on back from head to tail and not touching base of dorsal, the band broken up as brown spots behind head; corner of mouth with brown spot. Dorsal and anal whitish, former with a narrow dusky outer margin.

Distribution: Known only from 6 specimens from Pinda and Aldabra in the Western Indian Ocean and one specimen from the Laccadives.

95. *Callechelys melanotaenia* Bleeker

- Callechelys melanotaenia* Bleeker, Atlas Ichth., 4, p. 66, pl. (49) 193, fig. 2, 1864. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 289, 1916. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 188, fig. 1 h, 1970.
- Callechelys striatus* Smith, Ann. Mag. Nat. Hist., 12 (10), p. 838, pl. 27, fig. C, 1957. Smith, Ichth. Bull., 24, p. 450, pl. 65, C, 1962. Smith and Smith, Fishes of Seychelles, p. 56, pl. 47, D, 1963.

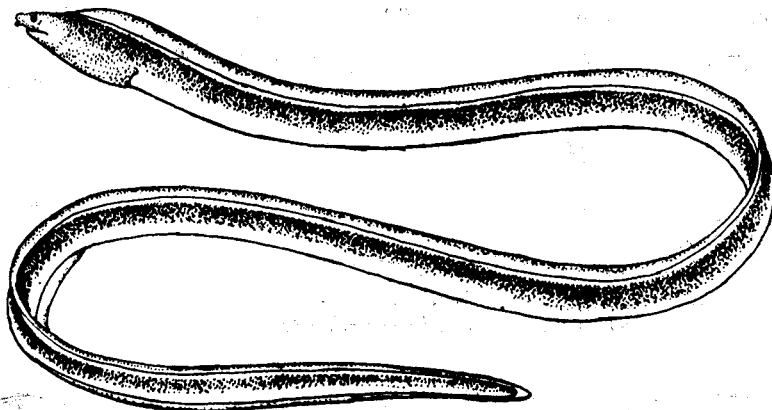


FIG. 95. *Callechelys melanotaenia* Bleeker, 580 mm. (after Jones and Kumaran)
Specimen studied: Kavarathi (1), 580 mm.

Head 17, depth of body 41, both in total length. Head 10.8 in trunk. Snout about 7.5 in head. Eye 2 in snout. Interorbital space almost equal to length of snout. Anterior nostrils in a short tube midway between tip of snout and eye; hind nostril a slit in fleshy upper lip opposite front border of eye. Cleft of mouth extending behind eye, about 3.5 in head. Teeth uniserial in jaws; 3 somewhat depressible canines on intermaxillary. Origin of dorsal somewhat opposite rictus. Dorsal and anal not confluent, leaving tip of tail free. Anal fin narrow. Pectorals absent. Colour: Whitish. Head with three transverse brown bands and a broad black band from side of head along upper part of body and tail. Head with dusky spots, 3 along upper jaw, 3 along mandible, 2 behind rictus, 2 postocular, one frontal and 2 postfrontal. Margin of dorsal fin black.

Distribution: Previously known from Red Sea, Aldabra, Seychelles, Mauritius, Indonesia, Ryukyus and Lord Howe, Gilbert and Palmyra islands.

96. *Myrichthys maculosus* (Cuvier)

- Muraena maculosa* Cuvier, Regne Animal., 2, p. 232, 1817.
- Myrichthys maculosus* Smith, Ichth. Bull., 24, p. 448, pl. 63, A, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 386, fig. 8, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 44/66).
- Myrichthys (Myrichthys) maculosus* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 284, fig. 129, 1916.

Specimens studied: Agathi (1), 497 mm. Chetlat (10), 93 to 530 mm. Kavarathi (1), 635 mm.

Head 13.8-15.8, depth of body 33.5-42.8, both in total length. Head 4.6-5.6 in trunk. Head and trunk 1.3-1.6 in tail. Eye 9.8-12.3 in head, 1.8-2.6 in snout and 1.3-2.0 in interorbital space. Cleft of mouth 3.1-3.7 in head, extending slightly behind a vertical from the hind border of eye. Snout projecting beyond tip of lower jaw. Teeth conical or granular, biserial in the jaws and on vomer and a few teeth on premaxillary plate. Anterior nostrils tubular, on the

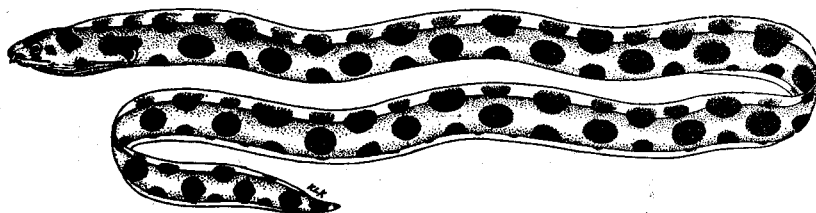


FIG. 96. *Myrichthys maculosus* (Cuvier), 530 mm.
(after Jones and Kumaran)

under side of snout just behind tip of upper jaw; posterior nostrils in upper lip below front of eye. Origin of dorsal on nape, nearer to eye than to gill opening. Dorsal and anal low, ending near tip of tail which projects as a stiff point. Pectoral rather short, as long as or slightly longer than diameter of eye. Colour: Pale yellowish or white with 2 or 3 alternating series of black blotches; the blotches along middle of side largest and varying from 25 to 31, the upper series partly extending on to dorsal fin leaving the edges white, lower series sometimes slightly extending to base of anal fin; large adults with smaller spots on lower sides of head and trunk and a dark spot on pectoral which is white.

Local names: *Lajjihiveng* (Minicoy). *Pambumalanhi* (other islands).

Distribution: Red Sea and east coast of Africa, Laccadives, Indonesia to the Philippines, Marshall, Phoenix and Hawaiian Islands.

97. *Myrichthys colubrinus* (Boddaert)

Muraena colubrina Boddaert, in Pallas, Neue Nord. Beytr., 2, p. 56, pl. 2, fig. 3, 1781.

Myrichthys colubrinus Smith, Ichth. Bull., 24, p. 448, pl. 63, B and C, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 44/67).

Myrichthys (*Chlevastes*) *colubrinus* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 285, figs. 130 and 131, 1916.

Ophichthys colubrinus Day, Fishes of India, p. 665, pl. 167, fig. 4, 1878.

Specimens studied: Agathi (2), 337 and 450 mm. Ameni (1), 540 mm. Kalpeni (1) 506 mm. Minicoy (2), 740 and 782 mm.

Head 17.8-19.5, depth of body 51-63, both in total length. Head 7.0-8.5 in trunk. Head and trunk 1.1-1.25 in tail. Eye 12.8-15.4 in head, 2.1-2.5 in snout and 1.8-2.3 in interorbital space. Snout tip to rictus 3.5-4.0 in head; rictus below hind border of eye; snout projecting beyond tip of lower jaw. Anterior nostrils tubular, below tip of snout; posterior nostrils in upper lip, below anterior border of eye. Teeth granular, a few teeth on premaxillary; in 2 series on jaws and vomer. Anal fin ending well before end of dorsal; tip of tail projecting as a stiff point. Dorsal origin before gill opening just behind nape. Pectoral rudimentary. Colour: Yellowish white, with 26-32 narrow dark brown rings; rings extending on to dorsal and often to base of anal; some of the rings not meeting ventrally in large specimens; interspaces between rings with one or two brown blotches especially in large specimens.

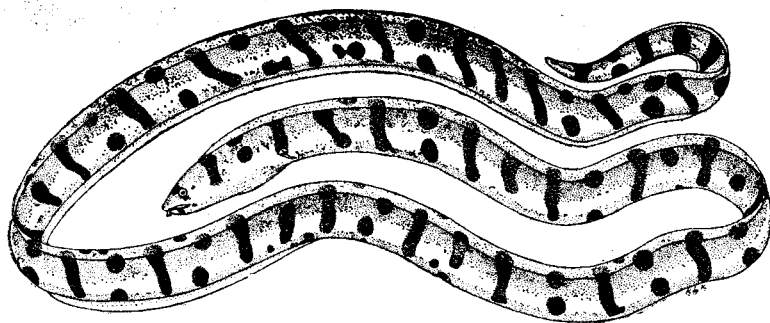


FIG. 97. *Myrichthys colubrinus* (Boddaert), 740 mm.

Local names: *Galikendiveng* (Minicoy). *Pambumalanhi* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Ryukyu Islands, Japan, eastwards to Marshall Islands, New Zealand and Tahiti.

98. *Leiuranus semicinctus* (Lay and Bennett)

Ophisurus semicinctus Lay and Bennett, Fishes, Zoology Capt. Beechey's Voyage, p. 66, pl. 20, fig. 4, 1839.

Leiurdnus phoenixensis Smith, Ichth. Bull., 24, p. 455, pl. 64, C, 1962.

Leiuranus semicinctus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 294, fig. 137, 1916. Munro, Fishes of Ceylon, p. 67, pl. 12, fig. 188, 1955. Smith, Ichth. Bull., 24, p. 455, pl. 63, D, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 44/68).



FIG. 98. *Leiuranus semicinctus* (Lay and Bennett), 210 mm.

Specimens studied: Ameni (4), 171 to 247 mm. Kadamat (4), 115 to 203 mm. Kalpeni (2), 204 and 213 mm. Kavarathi (1), 210 mm.

Head 12.6-14.2, depth of body 44.5-54.0, both in total length. Head 5.5-6.3 in trunk. Head and trunk slightly shorter or longer than tail. Tip of snout to rictus 3.0-3.4 in trunk. Eye 11.5-13.5 in head, 2.0-2.7 in snout and 1.6-1.8 in interorbital space. Snout pointed, much projecting beyond the tip of lower jaw. Anterior nostrils tubular, on lower surface of snout; posterior nostrils in the upper lip, below the eye. Teeth conical, in a single series in jaws; a few teeth on intermaxillary; teeth generally absent on vomer. Dorsal origin slightly behind a level from the gill opening; dorsal and anal low and not confluent around tail; caudal wanting. Pectoral longer than eye diameter. Colour: Pale yellowish white with 23-33 dark brown cross bands extending on to dorsal fin; bands generally broader than interspaces and not meeting ventrally, but sometimes meeting behind vent along mid-ventral line in juveniles.

Distribution: East coast of Africa to the Laccadives, Ceylon, Indonesia, Philippines, north to Japan and China, south to Australia, east to Samoan, Fiji and Hawaiian Islands.

99. *Ophichthys altipinnis* (Kaup)

Microdonophis altipinnis Kaup, Cat. Apodal Fish. British Mus., p. 6, 1856.

Ophichthys altipinnis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 308, fig. 146, 1916. Munro, Fishes of Ceylon, p. 68, pl. 12, fig. 192, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 44/69).



FIG. 99. *Ophichthys altipinnis* (Kaup), 865 mm.

Specimen studied: Minicoy (1), 865 mm.

Head 9.6, depth of body about 34, both in total length. Head 2.6 in trunk. Head and trunk 1.6 in tail. Eye about 15 in head and 3 in snout. Cleft of mouth reaching behind eye, about 2.8 in head. Anterior nostril tubular, on edge of snout; posterior nostril a slit in upper lip in advance of eye. Dorsal origin before a level from the gill openings. Dorsal fin as high as body anteriorly, gradually becoming narrower behind. Anal lower than dorsal. Pectoral 2.7 in head. Teeth conical, in a single series on sides of jaws, 2 rows of teeth on intermaxillary, mandible with a few teeth on the inside of symphysis; a single series of teeth on vomer. Colour: Brownish above becoming pale yellowish below. Front of dorsal about 2/3 length of head blackish, rest of the fin pale with dark brown margin; anal pale with dark margin; pectoral dark with the edges pale.

Local name: *Harufaveng* (Minicoy).

Distribution: Laccadives, Ceylon and Celebes.

100. *Pisoodonophis cancrivorus* (Richardson)

Ophisurus cancrivorus Richardson, Voy. *Erebus* and *Terror*, Fishes, p. 97, pl. 50, figs. 6-9, 1844.

Pisoodonophis cancrivorus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 300, 1916. Smith, Fishes of Southern Africa, p. 510, fig. 1100 a, 1949. Munro, Fishes of Ceylon, p. 67, pl. 11, fig. 189, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959. Smith, Ichth. Bull., 24, p. 456, fig. 3, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 5, 1969 (Cat. No. CMFRI-LA-F. 44/70).



FIG. 100. *Pisoodonophis cancrivorus* (Richardson), 205 mm.

Specimen studied: Minicoy (1), 205 mm.

Head 9.3, depth of body .25.5, both in total length. Head 2.7 in trunk. Head and trunk about 1.5 in tail. Eye about 14 in head and 2 in snout. Snout 6.3 in head. Cleft of mouth reaching posterior to a level from the hind border of eye; 3.2 in head. Anterior nostrils a short tube on the edge of snout; posterior nostrils in upper lip below front border of eye. Teeth granular, in a patch on intermaxillary, 3 rows on vomer and in bands in jaws. Dorsal origin above middle of pectorals. Dorsal and anal low, ending before tip of tail. Pectorals 2.8 in head. Colour: Brownish yellow, lighter below.

Distribution: Arabia, Madagascar, Mauritius, Inhaca, Laccadives, Ceylon, Indonesia to the Philippines, north to China and Japan and south to Australia and Samoa.

Family ECHELIDAE

Very elongate, vermiform body. Vent far behind gill openings, in anterior half of total length. Teeth small, in one or two series in jaws, sometimes absent on vomer. Dorsal origin above or far behind gill openings. Caudal confluent with dorsal and anal. Pectorals present or absent. Anterior nostrils tubular at the margin of upper lip near tip of snout. Hind nostrils in upper lip in a valve.

101. *Muraenichthys macropterus* Bleeker

Muraenichthys macropterus Bleeker, Act. Soc. Sc. Indo-Neerl., 2, p. 91, 1857. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 3, p. 275, 1916. Smith, Ichth. Bull., 24, p. 461, fig. 7, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, 10, p. 322, fig. 2, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 43/513).

Specimen studied: Minicoy (1), 255 mm.

Head 10.5, depth of body 32, both in total length. Head 2.9 in trunk. Eye 11.5 in head and 1.7 in snout. Head and trunk 1.6 in tail. Anterior nostrils tubular, near front of snout. Posterior nostrils on upper lip, with valvular flap, below front edge of eye. Teeth small, subconical in maxillary and mandibles. A single series of teeth on vomer. Origin of dorsal nearer to eye than to vent. Caudal confluent with dorsal and anal. Colour: Pale yellowish.

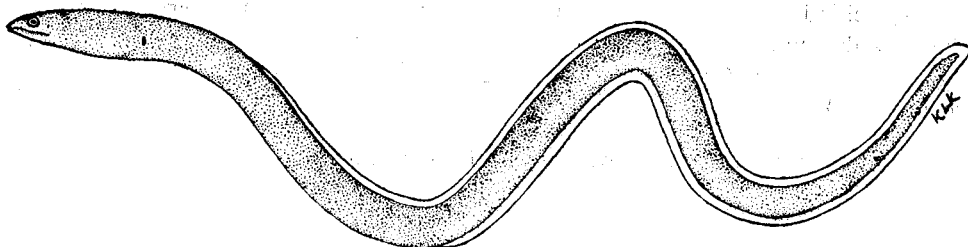


FIG. 101. *Muraenichthys macropterus* Bleeker, 255 mm.
(after Jones and Kumaran)

Local name: *Faniveng* (Minicoy).

Distribution: Mozambique, Laccadives, Indonesia, Philippines, Japan, New Caledonia, Marshall Islands, Tongatabu and Australia.

Family NEMICHTHYIDAE

Long slender somewhat compressed body. Jaws needle-like, produced. Cleft of mouth reaching behind eye. Head slightly flattened on top. Dorsal and anal long, well developed and confluent with caudal. Pectoral present. Vent far forward, sometimes close to gill openings. Nostrils close together, in front of eye. Teeth minute, close together on jaws and vomer. Gill openings wide, the interspace between them narrow.

102. *Serrivomer microps* (Alcock)

Gavialiceps microps Alcock, Ann. Mag. Nat. Hist., (6) 4, p. 461, 1889. Alcock, Ibid., (6) 10, p. 364, 1892. Munro, Fishes of Ceylon, p. 69, 1955.

Serrivomer microps Norman, John Murray Exped., 7, p. 33, 1939.

Serrivomer sector Garman, Mem. Mus. Comp. Zool., 24, p. 320, pl. 43, 1899. Brauer, *Valdivia Tiefsee-Fische*, p. 132, pl. 8, fig. 4, 1906.

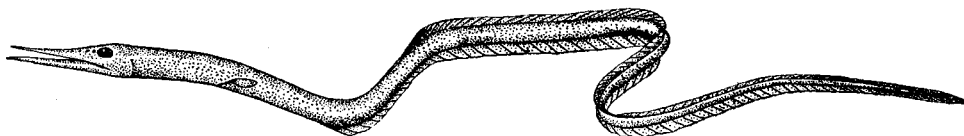


FIG. 102. *Serrivomer microps* (Alcock). (after Brauer)

Body elongate and moderately compressed with long lash-like tail. Head and trunk about 2.5 in tail. Head depressed, about twice length of trunk and 5.5-6.0 in total length. Jaws produced into a long beak. Eyes minute, subcutaneous and situated before the angle of the mouth. Teeth small, sharp; anteriorly in a rasp-like band in the maxillary; a row of enlarged teeth and another row of small teeth in the mandible. Vomerine teeth slightly larger. Two minute nostrils in a triangular depression in front of eye. Gill openings close together, wide. The dorsal fin is feebly developed, its origin about a head length behind head and behind a level from origin of anal. Vertical fins confluent with caudal. Pectorals very small. Vent about a snout length behind gill openings. Colour: Grey brown with small dark dots, belly and branchiostegal region black.

Distribution: Atlantic, Indian and Pacific Oceans.

Order HALOSAURIFORMES

Physoclastic. Elongate and compressed with long tapering tail without distinct caudal fin. Ventrals abdominal with 8-13 rays. Upper jaw bordered with premaxillaries and maxillaries. Mouth inferior. Photophores sometimes present.

Family HALOSAURIDAE

Body elongate, tail very long, strongly compressed and narrowed into a filament. Head depressed in front; snout projecting beyond the mouth. Mouth horizontal, moderate. Teeth in bands in jaws; rudimentary teeth present on palatines and pterygoid. Gill membranes free from isthmus. Scales cycloid, present on body and upper part of head excluding snout. Lateral line low; scales of lateral line often enlarged, each with a luminous organ. Dorsal fin short, inserted behind ventrals.

1. Lateral line scales scarcely enlarged, without luminous organs. Head more than twice in distance from operculum to anal origin
..... *Halosaurus parvipinnis*
Lateral line scales much enlarged, with luminous organs. Head less than twice in distance from operculum to anal origin 2
2. Head more than 1.5 in distance between head and anal. Dorsal origin behind base of ventral. 8 pectoral rays *Halosauropsis mediorostris*
Head about twice in distance between head and anal. Dorsal origin above hind quarter of ventral. 10-13 pectoral rays *Halosauropsis affinis*

103. *Halosaurus parvipinnis* Alcock

Halosaurus parvipennis Alcock, Ann. Mag. Nat. Hist., (6) 10, p. 362, 1892. Norman, John Murray Exped., 7, p. 46, 1939.

Halosaurus parvipinnis Alcock, Illus. Zool. Investigator, pl. 33, fig. 1, 1895.

D. 9; P. 12-13; V. 10. Ltr. 10+1+3.

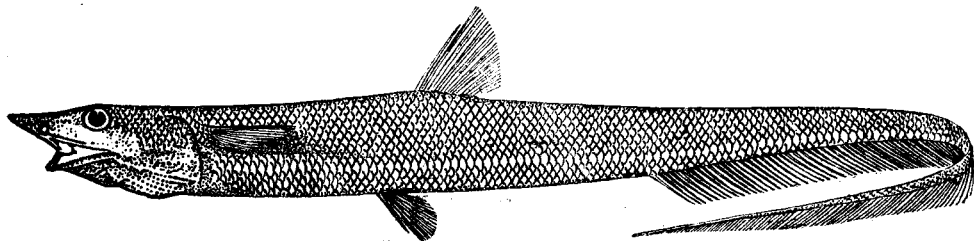


FIG. 103. *Halosaurus parvipinnis* Alcock. (after Alcock)

Body slightly compressed, tail gradually tapering. Head about 8 in total length. Eye about 6.4 in head, about 2.5 in snout and less than 0.3 in inter-orbital space. Maxillary not quite reaching vertical through anterior border of eye. Villiform teeth in bands in jaws and palatines and in a narrow band on the pterygoids. Dorsal origin about an eye diameter behind ventrals which arise about a head length behind the gill openings. Pectoral narrow, pointed, longer than snout. Scales of lateral line slightly larger and much more adherent than those of the rest of the body. Colour: Light brown; opercles silvery, throat and branchiostegal membranes black, fins darker than body.

Distribution: Gulf of Aden, Laccadive Sea and Maldives area.

104. *Halosauropsis mediostris* (Günther)

Halosaurus mediostris Günther, *Challenger Rep. Deep Sea Fish.*, 22, p. 239, pl. 59, fig. C, 1887. Alcock, *J. Asiat. Soc. Bengal*, 63 (2), p. 136, 1894.

Halosauropsis mediostris Weber and de Beaufort, *Fishes of the Indo-Australian Archipelago*, 4, p. 4, 1922.

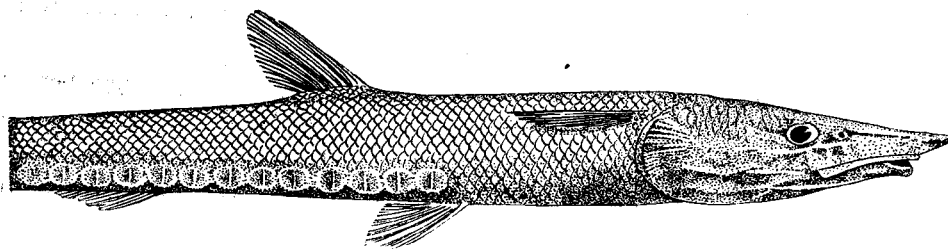


FIG. 104. *Halosauropsis mediostris* (Günther). (after Günther)

D. 11; P. 8; V. 8.

Head about 1.7 in trunk. Depth of body about 20 in total length. Head about 1.5 in distance between head and ventrals. Snout produced, about 2.3 in head. Eye more than 8 in head and less than 4 in snout. Maxillary reaching to a vertical from the front border of eye. Nostrils small, close together in front of eye. Angular ridges present on head. Origin of dorsal more than two eye diameter behind a level from ventrals. Pectoral longer than postorbital length of head and almost reaching to ventrals. Scales deciduous; lateral line scales greatly enlarged, each with a luminous organ. About 25 scales in lateral line before vent. Colour: Violet brown; upper parts of head silvery; branchial and buccal cavities blackish.

Distribution: Laccadive Sea, Bali Sea and west of Philippine Islands.

105. *Halosauropsis affinis* (Günther)

Halosaurus affinis Günther, Ann. Mag. Nat. Hist., 20, p. 444, 1877. Günther, *Challenger Rep. Deep Sea Fish.*, 22, p. 241, pl. 59, B, 1887. Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 309, 1890.

Halosauropsis affinis Weber and de Beaufort, *Fishes of the Indo-Australian Archipelago*, 4, p. 5, 1922. Munro, *Fishes of Ceylon*, p. 70, pl. 14, fig. 197, 1955.

Halosaurus anguilliformis Alcock, Ann. Mag. Nat. Hist., (6) 4, p. 453, 1889.

Halosaurus Hoskynii Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 309, 1890.

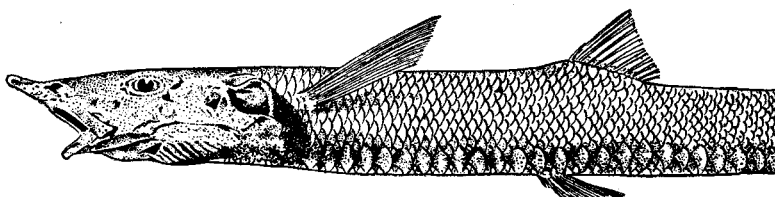


FIG. 105. *Halosauropsis affinis* (Günther). (after Alcock)

D. 10-12; A. about 175; P. 10-13; V. 8.

Head 7-8, depth of body 17-22, both in standard length. Head exceeding distance between gill opening and base of ventral fin by about an eye diameter. Snout produced, 2.3-2.5 in head. Eye 6.5-7.5 in head and equal to interorbital space. The maxilla almost reaches vertical through front border of eye. Pterygoid band of teeth very broad and not continuous with the palatine band. Origin of dorsal above base of ventrals. Pectoral longer than postorbital length of head. Scales deciduous. Lateral line low, scales on lateral line larger and more adherent than the rest and each with a luminous organ. Twentynine to thirty scales on lateral line between gill opening and vent. Colour: Light brown; snout, ventral side and end of tail darker.

Distribution: Laccadive Sea, Gulf of Mannar, Bay of Bengal, Timor Sea and south of Japan.

Order BELONIFORMES

Physoclistic. Fins without spines. Dorsal and anal fins opposed and inserted far backwards. Ventrals abdominal with six rays. Lower pharyngeals, completely united. Upper jaw formed only by premaxillaries. Jaws sometimes produced. 9-15 branchiostegals. Scales cycloid; lateral line near lower profile.

1. Mouth large, both jaws produced; teeth enlarged BELONIDAE
Mouth small, both jaws normal or only the lower jaw produced; teeth small 2
2. Lower jaw produced into a beak; pectoral fin usually short HEMIRAMPHIDAE
Lower jaw normal; pectoral enlarged and often wing-like EXOCOETIDAE

Family BELONIDAE

Body elongate, cylindrical or compressed. Mouth very large; jaws produced. Jaws with bands of small teeth and with a series of distant canines. Teeth sometimes present on vomer and tongue. Gill openings wide. Gill membranes not united with isthmus. Dorsal and anal fins opposite and inserted far back. Pectorals inserted high up. Scales cycloid and deciduous. Lateral line near lower profile, sometimes forming a keel on caudal peduncle.

1. Gill rakers present. Caudal peduncle strongly depressed and with a lateral keel on each side. Vomerine teeth present. Eye 1.6-1.8 in postorbital part of head which is 2.2-2.4 in distance between origin of ventral and origin of anal *Belone platyura*
Gill rakers absent or vestigial. Caudal peduncle compressed or slightly depressed 2
2. A semicircular bony projection below lower jaw just behind its tip *Thalassosteus appendiculatus*
No bony projection below lower jaw 3
3. Body strongly compressed. Depth of body more than twice its width. Base of intermaxillaries swollen *Ablennes hians*
Body only slightly compressed. Depth of body less than twice its width. Base of intermaxillaries not swollen 4
4. Caudal rounded or truncate. Lateral line not forming a keel on caudal peduncle 5
Caudal forked. Lateral line forming a keel on caudal peduncle 6
5. Not more than 16 anal rays. A bluish black blotch on base of caudal *Strongylura strongylura*

- Anal rays ii, 20. No blotch on base of caudal. Origin of dorsal above second divided ray of anal *Strongylura incisa*
6. D. ii, 20-22. Canines of upper jaw curved forward. Dorsal yellowish with greenish tinge becoming blackish distally *Strongylura gigantea*
- D. ii, 23. Canines of upper jaw vertical. Dorsal blackish
..... *Strongylura melanota*

106. *Belone platyura* Bennett

Belone platyura Bennett, Proc. Comm. Zool. Soc. London, pt. 1, p. 168, 1831. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 108, fig. 1, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 46/71).

Belone (Eurycaulus) platyura Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 118, 1922.

Belone (Eurycaulus) persimilis Balan, J. Bombay nat. Hist. Soc., 55, p. 299, 1958.



FIG. 106. *Belone platyura* Bennett, 348 mm.
(after Jones and Kumaran)

Specimens studied: Agathi (2), 305 and 308 mm. Androth (1), 282 mm. Bangaram (1), 306 mm. Kalpeni (2), 325 and 348 mm. Kavarathi (2), 278 and 297 mm. Minicoy (3), 321 to 340 mm. Suheli (1), 337 mm.

D. ii, 12-13; A. ii, 15-17; P. i, 10-11; V. i, 5. L1. 147-165; Ltr. 11-12+1+4.

Head 2.65-3.0 in standard length, 2.85-3.2 in total length. Depth of body about 17.5-19.2 in standard length, 19-21 in total length. Eye 7-8 in snout, 1.6-1.8 in postorbital length of head, 3.4-4.0 in distance between origin of ventral and origin of anal and equal to or slightly more than interorbital space. Snout tip shorter than lower jaw by $\frac{1}{4}$ -1 eye diameter. Postorbital length of head 2.2-2.4 in distance between origin of ventral and origin of anal. Dorsal origin behind a vertical through anal origin. Pectoral $\frac{1}{3}$ eye diameter longer than postorbital length of head. Caudal peduncle depressed, with a sharp lateral keel continued on middle rays of caudal above lateral line. Well developed gill rakers 4-5+12-13. Colour: Deep brown with greenish tinge on back and upper part of head, silvery white below, with a dark band along sides of body. Dorsal, anal and ventral yellowish hyaline, often slightly dusky distally.

Local names: *Dethuntholi* (Minicoy). *Oola*, *Keran* (other islands).

Distribution: Red Sea, Aldabra and Mauritius in the Western Indian Ocean to the Laccadives, Singapore, Indonesia, Marianas, Marshall, Samoan and Hawaiian Islands.

107. *Thalassosteus appendiculatus* (Klunzinger)

Belone appendiculata Klunzinger, Fische des Rothen Meeres, p. 580, 1871.

Thalassosteus appendiculatus Jones and Kumaran, Indian J. Fish., 6, pp. 44 and 50, fig. 5 b and c, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 46/72).

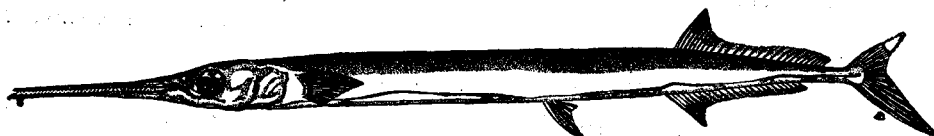


FIG. 107. *Thalassosteus appendiculatus* (Klunzinger), 740 mm.

Specimens studied: Minicoy (4), 740 to 785 mm.

D. ii, 23-24; A. ii, 20-21; P. i, 12; V. i, 5. Ll. 270-285; Ltr. 30-34+1+7-8.

Body subcylindrical. Head 3.3-3.5 in standard length, 3.6-3.8 in total length. Depth of body 12.5-13.5 in standard length, 14.0-14.8 in total length. Eye 9.0-9.7 in head, 6.0-6.8 in snout and 1.3-1.4 in interorbital space. Canines in jaws almost vertical. A semicircular bony projection below lower jaw just behind its tip. Distance between ventral and anal fins 2.0-2.1 in distance between insertion of pectoral and anal. Dorsal origin above a level from the third ray of anal. Pectoral slightly longer than postorbital length of head. Ventral slightly shorter than pectoral. Caudal deeply forked. Lateral line with slight keel on caudal peduncle. Colour: Greenish brown on dorsal parts of head and body, whitish below. Dorsal and anal pale, greenish towards margin.

Local name: *Thaludandithuntholi* (Minicoy).

Distribution: Red Sea, Laccadives, West coast of India, Gulf of Mannar, Solomon Islands and Papua.

108. *Ablennes hians* (Valenciennes)

Belone hians Valenciennes, Hist. Nat. Poissons, 18, p. 321, pl. 548, 1846.

Ablennes hians Smith, Fishes of Southern Africa, p. 130, pl. 7, fig. 226, 1949. Munro, Fishes of Ceylon, p. 71, pl. 13, fig. 199, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 46/73).

Athlennes hians Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 131, fig. 49, 1922.

Belone melanostigma Day, Fishes of India, p. 509, 1878.



FIG. 108. *Ablennes hians* (Valenciennes), 570 mm.

Specimens studied: Agathi (3), 630 to 650 mm. Kavarathi (3), 615 to 630 mm. Minicoy (1), 570 mm.

D. ii, 21; A. ii, 23; P. i, 13; V. i, 5; Ll. \pm 360; Ltr. 26-29+16+-8.

Head 3.25-3.3 in standard length, 3.55-3.6 in total length. Depth of body 14-15 in standard length, 15.5-16.5 in total length. Eye 7.5-7.8 in snout, 2.2-2.3 in postorbital length of head, a little shorter than interorbital space and about 6 in distance between ventral insertion and anal origin. Body strongly compressed, width of body about 2.2 in its depth. Intermaxillaries swollen at base. Canines in jaws straight and slender. Origin of dorsal behind a level from anal origin. Pectoral equal to postorbital part of head and $\frac{1}{2}$ eye diameter. Ventral shorter than postorbital part of head and situated much nearer to border of preopercle than to base of caudal. Caudal forked. Colour: Dark greenish to bluish above, pale silvery below. 8-10 short dark cross bars on sides of body. Dorsal blackish, anal and ventral yellowish. Caudal and pectoral dusky, the latter with blackish tip.

Local names: *Dethuntholi* (Minicoy). *Karuthonakunhi* (other islands).

Distribution: Widely distributed in the tropical Atlantic, Indian and Pacific Oceans.

109. *Strongylura strongylura* (van Hasselt)

Belone strongylura van Hasselt, Alg. Konst. en Letterbode, **1**, p. 130, 1823.

Belone strongylurus Day, Fishes of India, p. 512, pl. 118, fig. 6, 1878.

Strongylura strongylura Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 6, 1969 (Cat. No. CMFRI-LA-F. 46/74).

Tylosurus strongylurus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **4**, p. 121, 1922. Munro, Fishes of Ceylon, p. 73, pl. 13, fig. 201, 1955.

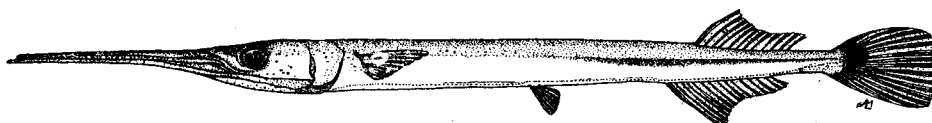


FIG. 109. *Strongylura strongylura* (van Hasselt), 204 mm.

Specimens studied: Agathi (1), 276 mm. Minicoy (4), 103 to 204 mm.

D. ii, 11-12; A. ii, 14; P. i, 10; V. i, 5. Ll. about 140; Ltr. 13+1+5

Head 2.5-2.6 in standard length, 2.8-2.95 in total length. Depth of body 15.0-16.5 in standard length, 17.0-18.7 in total length. Eye 2.8-3.2 in postorbital length of head, 7.5-8.5 in snout, 5.0-5.6 in distance between ventral insertion and anal origin and a little less than interorbital space. Canines small and directed slightly backwards. Origin of dorsal opposite to 2nd or 3rd branched anal

ray. Pectoral equal to or a little shorter than postorbital part of head. Ventral arising midway between anterior border of eye and base of caudal. Caudal somewhat rounded. Colour: Light greenish brown above becoming yellowish white below with a dark silvery longitudinal band laterally which is more distinct posteriorly. Caudal yellowish with greenish tinge, other fins yellowish. A bluish black blotch on base of caudal.

Local names: *Dethuntholi* (Minicoy). *Oola*, *Keran* (Agathi).

Distribution: From the Laccadives, coasts of India and Ceylon to Malaysia, Indonesia, Philippines, China, Taiwan and North Australia.

110. *Strongylura incisa* (Valenciennes)

Belone incisa Cuvier and Valenciennes, Hist. Nat. Poissons, **18**, p. 335, 1846.

Strongylura incisa Jones and Kumaran, J. Mar. biol. Ass. India, **7**, p. 109, fig. 2, 1965.

Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 6, 1969 (Cat. No. CMFRI-LA-F. 46/75).

Tylosurus incisus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **4**, p. 125, 1922.



FIG. 110. *Strongylura incisa* (Valenciennes), 314 mm.
(after Jones and Kumaran)

Specimens studied: Agathi (4), 296 to 575 mm. Bangaram (1), 437 mm. Kavarathi (1), 345 mm. Minicoy (12), 55 to 199 mm.

D. ii, 17-18; A. ii, 20; P. i, 10-11; V. i, 5. LL. 165-180; Ltr. 13-14+1+5-6.

Head 2.4-2.7 in standard length, 2.6-2.95 in total length. Depth of body 15.0-18.5 in standard length, 16.8-20.5 in total length. Width of body 1.3 in its depth. Eye 7.3-9.0 in snout, 2.4-2.7 in postorbital length of head, 4.2-5.3 in distance between origin of ventral and origin of anal and about 1.2 in interorbital space. Postorbital length of head 1.8-2.1 in distance between origin of ventral and origin of anal. Canines of upper jaw directed straight downward. Origin of dorsal above second branched ray of anal. Pectoral about 1/4 eye diameter longer than postorbital length of head. Ventral 1/2 eye diameter shorter than postorbital length of head. Origin of ventral nearer to hind border of eye than to base of caudal. Lateral line along ventro-lateral edge of body and ending near caudal base without raised keel. Caudal with concave margin. Colour: Light brownish above, lighter below with a dark longitudinal lateral band. Fins pale yellowish, bases of pectoral rays slightly dark.

Local names: *Dethuntholi* (Minicoy). *Oola*, *Keran* (other islands).

Distribution: Laccadives to Singapore, Indonesia, Philippines, and Marianas, Marshall, Admiralty Islands, New Guinea and Samoa.

111. *Strongylura gigantea* (Temminck and Schlegel)

Belone gigantea Temminck and Schlegel, Fauna Japonica, Pisces, p. 245, 1846.

Belone annulata Day, Fishes of India, p. 510, pl. 120, fig. 1, 1878.

Strongylura gigantea Schultz, Bull. U.S. Nat. Mus., 202, 1, p. 162, 1953. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 46/76).

Tylosurus annulatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 126, 1922. Smith and Smith, Fishes of Seychelles, p. 9, 1963.

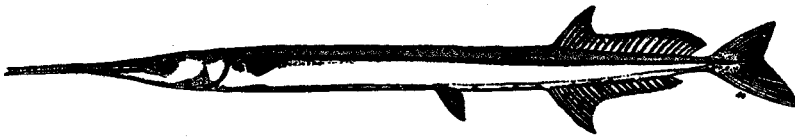


FIG. 111. *Strongylura gigantea* (Temminck and Schlegel), 437 mm.

Specimens studied: Agathi (2), 247 and 283 mm. Ameni (2), 330 and 437 mm. Chetlat (1), 245 mm. Kavarathi (3), 225 to 323 mm. Minicoy (2), 155 and 269 mm.

D. ii, 20-22; A. ii, 18-20; P. i, 12-13; V. i, 5. Ll. 215-230; Ltr. 23-25+1+6-7.

Head 3.0-3.3 in standard length, 3.3-3.65 in total length. Depth of body 15-17 in standard length, 16.6-19.0 in total length. Width of body about 1.2 in depth. Eye 6.0-7.2 in snout, 2.2-2.5 in postorbital length of head, 1.1-1.3 in interorbital space and 4.5-5.6 in distance between origin of ventral and anal. Postorbital length 2.0-2.2 in distance between origin of ventral and anal. Interorbital groove broad and shallow, supraorbital region striated feebly. Canines well developed, those on upper jaw curved a little forward. Middle dorsal rays shorter than hinder rays. Dorsal origin slightly behind a vertical through anal origin. Pectoral a little longer than postorbital length of head. Ventral shorter than postorbital part of head and situated nearer to eye than to base of caudal. Caudal forked, lower lobe longer. Lateral line forming a slightly elevated dark brown ridge or keel on caudal peduncle. Colour: Brownish above, pale silvery below with a narrow bluish green band from opercle to base of caudal. Fins yellowish with greenish tinge, hinder half of dorsal and median caudal rays blackish distally.

Local names: *Dethuntholi* (Minicoy). *Oola*, *Keran* (other islands).

Distribution: Seychelles, Laccadives, coasts of India, Indonesia, Malaysia to the Philippines, Japan, North Australia, Bikini Atoll, Samoa and Hawaiian Islands.

112. *Strongylura melanota* (Bleeker)

Belone melanotus Bleeker, Nat. Tijds. Ned.-Ind., 1, p. 94, 1850.

Strongylura melanota Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 46/77).

Tylosurus melanotus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 127, fig. 47, 1922. Smith, Fishes of Southern Africa, p. 130, 1949.

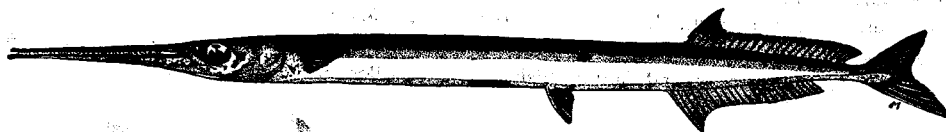


FIG. 112. *Strongylura melanota* (Bleeker), 520 mm.

Specimen studied: Kalpeni (1), 520 mm.

D. ii, 23; A. ii, 21; P. i, 12; V. i, 5. Ll. 265; Ltr. 29-31+1+8-9.

Head 3.1 in standard length, about 3.4 in total length. Depth of body 16 in standard length, 17.6 in total length. Maximum width of body about 1.3 in its depth. Eye 7 in snout, about 2.2 in postorbital length of head, a little less than interorbital space and 4.8 in distance from ventral origin to anal origin. Canines in jaws short and straight. Origin of dorsal above first branched ray of anal. Pectoral equal to postorbital part of head, ventrals much shorter. Ventrals midway between hind border of eye and caudal base. Caudal deeply forked. Lateral line forming a dark keel on caudal peduncle. Colour: Dark greenish brown above, pale white below. Dorsal blackish, anal with dark outer border. Ventral and caudal dusky. Pectoral slightly dusky, posterior half of median rays blackish.

Local names: *Oola*, *Keran* (Kalpeni).

Distribution: East coast of South Africa, Seychelles to the Laccadives, Malaysia, Indonesia, Philippines, Taiwan, Japan, New Britain, New Caledonia and North Australia.

Family HEMIRAMPHIDAE

Body moderately or extremely elongate, cylindrical or compressed. Mandibles produced into a long bony beak with a fold of skin on each side and another median fold below. Intermaxillaries forming a triangular projection. Teeth minute. Gill rakers well developed. Dorsal origin far backwards. Pectorals high up.

1. Upper jaw naked. Nasal fossa rounded and deeply depressed, its postero-lateral border without prominent bony rim. Length of base of anal 1.6-1.7 in that of dorsal *Hemiramphus marginatus*
Upper jaw scaled. Nasal fossa broad and little depressed, its posterolateral border with a prominent bony rim 2
2. Triangular part of upper jaw slightly longer than broad. Length of base of anal more than 1.5 in that of dorsal *Hyporhamphus georgi*
Triangular part of upper jaw broader than long. Length of base of anal less than 1.5 in that of dorsal 3
3. Ventral origin nearer to gill opening than to base of caudal. Head from tip of upper jaw to branchial opening about 3.3 in trunk. Outer rays of caudal dark *Hyporhamphus unifasciatus*
Ventral origin midway between hind border of operculum and base of caudal or nearer to the latter 4
4. 16 divided rays in anal fin. Preorbital equal to eye diameter. Origin of ventral midway between pectoral base and caudal base
..... *Hyporhamphus balinensis*
12-13 divided rays in anal fin. Preorbital much shorter than eye diameter. Ventral origin nearer to caudal base than to base of pectoral
..... *Hyporhamphus dussumieri*

113. *Hemiramphus marginatus* (Forskål)

Esox marginatus Forskål, Descript. Animal., p. 67, 1775.

Hemiramphus marginatus Smith and Smith, Fishes of Seychelles, p. 9, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 47/78).

Hemiramphus marginatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 157, 1922. Munro, Fishes of Ceylon, p. 74, pl. 13, fig. 207, 1955.

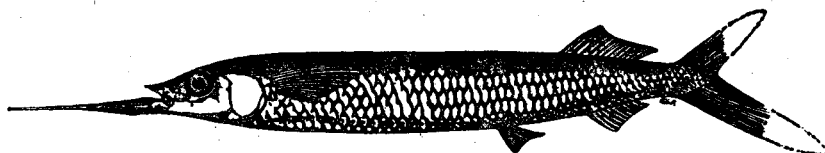


FIG. 113. *Hemiramphus marginatus* (Forskål), 270 mm.

Specimens studied: Agathi (2), 270 and 295 mm. Bitra (1), 260 mm.

D. ii, 11-12; A. ii, 9-10; P. i, 10; V. i, 5. Ll. 54-56; Ltr. $6\frac{1}{2}+1+1\frac{1}{2}$.

Entire head 2.2-2.4 in standard length, 2.8-2.9 in total length. Head from tip of upper jaw to margin of opercular flap 3.2-3.4 in trunk. Body strongly compressed, breadth of body 1.5-1.7 in its depth. Depth of body 8.0-8.5 in standard length, 9.0-10.0 in total length. Length of lower jaw beyond

tip of upper jaw 3.8-4.2 in standard length. Eye 3.8-4.0 in head, 1.3 in snout and equal to interorbital space. Upper jaw broader than long. Origin of anal opposite to the 5th ray of dorsal. 36-39 predorsal scales. Length of base of anal 1.6-1.7 in base of dorsal. Pectoral $3/5$ length of snout shorter than head. Ventral shorter than postorbital length of head. Origin of ventral twice nearer to base of caudal than to tip of snout. Colour: Greenish brown, darker above becoming whitish below. Dorsal pale to dusky, anterior rays darker. Caudal bordered with dusky. Pectoral, ventral and anal fins hyaline.

Local names: *Komban*, *Keram* (other islands).

Distribution: Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China and eastwards to New Caledonia and Tongatabu.

114. *Hyporhamphus georgi* (Valenciennes)

Hemiramphus georgii Cuvier and Valenciennes, Hist. Nat. Poissons, 19, p. 37, 1846.

Hemiramphus georgii Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 147, 1922. Munro, Fishes of Ceylon, p. 74, 1955.

Hyporhamphus georgii Smith and Smith, Fishes of Seychelles, p. 9, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 47/79).

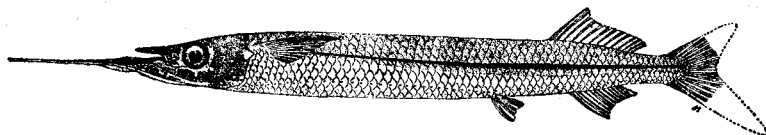


FIG. 114. *Hyporhamphus georgi* (Valenciennes), 235 mm.

Specimen studied: Agathi (1), 235 mm.

D. ii, 12; A. ii, 12; P. i, 10; V. i, 5. Ll. 58; Ltr. $6\frac{1}{2}+1+1\frac{1}{2}$.

Entire head 2.5 in standard length, 3.1 in total length. Head from tip of upper jaw to hind margin of opercular flap 2.3 in trunk. Body compressed, its breadth about 1.4 in depth. Depth of body 11 in standard length, 12.5 in total length. Length of lower jaw beyond tip of upper jaw about 5.3 in total length. Eye about 1.5 in snout and less than interorbital space. Snout as long as postorbital length of head; upper jaw slightly longer than broad. Teeth in narrow bands in jaws. Origin of anal opposite to third ray of dorsal. Length of base of anal about 1.7 in that of dorsal. Pectoral equal to head without snout. Ventral slightly more than half length of pectoral. Colour: Greenish brown above, whitish below with a silvery lateral band along sides. Scales of back with dusky edges. Dorsal pale, anterior rays dark distally. Pectoral, ventral and anal fins hyaline.

Local names: *Komban*, *Keram* (Agathi).

Distribution: Widespread from Mauritius and Seychelles to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Taiwan, eastwards to Gilbert Islands.

115. *Hyporhamphus unifasciatus* (Ranzani)

Hemirhamphus unifasciatus Ranzani, Nov. Comm. Acad. Sci. Inst. Bonon, **5**, p. 326, 1842.
Day, Fishes of India, p. 514, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **4**, p. 149, 1922.

Hyporhamphus unifasciatus Munro, Fishes of Ceylon, p. 74, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 6, 1969 (Cat. No. CMFRI-LA-F. 47/80).

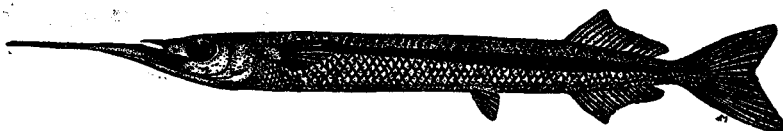


FIG. 115. *Hyporhamphus unifasciatus* (Ranzani), 193 mm.

Specimen studied: Agathi (1), 193 mm.

D. ii, 13; A. ii, 15; P. i, 10; V. i, 5. Ll. 56.

Entire head 2.7 in standard length, 3.2 in total length. Head from tip of upper jaw to hind margin of opercular flap about 3.3 in trunk. Body elongate, compressed, breadth of body about 1.4 in its depth. Depth of body about 10.6 in standard length, 11.3 in total length. Length of lower jaw beyond tip of upper jaw 5.6 in standard length, 6.4 in total length. Eye 4.3 in head, about 1.6 in postorbital length of head and a little less than interorbital space. Upper jaw broader than long. Preorbital much shorter than eye. Jaws with 4-5 rows of teeth. Origin of anal opposite to that of dorsal. Distance between ventral and anal equal to distance between angle of jaws to gill opening. Length of anal base somewhat equal to that of dorsal. Pectoral slightly less than head without snout. Ventral more than half length of pectoral. Ventral origin nearer to gill opening than to base of caudal. Caudal moderately forked, lower lobe longer, median rays $1\frac{1}{2}$ eye diameter. 35 predorsal scales. Colour: Sides and below light yellowish, back slightly greenish, a bluish lateral band bordered above by black. Scales of back with dusky edges. Anterior rays of dorsal and other rays of caudal dark, rest of fins little dusky. Pectoral, ventral and anal hyaline, tips of anterior rays of anal slightly dusky.

Local name: *Oola* (Agathi).

Distribution: Pantropical.

Note: *H. knysnaensis* Smith (Trans. Roy. Soc. S.A., **21**, p. 129, 1933) differing in having longer lower jaw, the ventral originating midway between base of pectoral and base of caudal and distance between the ventral and anal less than the length of base of anal is closely related to this species, if not identical.

116. *Hyporhamphus balinensis* (Bleeker)

Hemiramphus balinensis Bleeker, Nat. Tijds. Ned.-Ind., 17, p. 170, 1858-59.

Hemiramphus balinensis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 152, 1922.

Hyporhamphus balinensis Smith, Fishes of Southern Africa, p. 128, 1949. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 109, fig. 3, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 47/81).



FIG. 116. *Hyporhamphus balinensis* (Bleeker), 214 mm.
(after Jones and Kumaran)

Specimen studied: Ameni (1), 214 mm.

D. ii, 14; A. ii, 16; P. i, 10; V. i, 5. Ll. 59; Ltr. $6\frac{1}{2} + 1 + 2\frac{1}{2}$; Pred. 40.

Entire head 2.75 in standard length, about 3.1 in total length. Head from tip of upper jaw to hind margin of opercular flap 3.4 in trunk. Body compressed, breadth of body 1.2 in depth. Depth of body about 12 in standard length, 13.8 in total length. Length of lower jaw beyond tip of upper jaw 5 in standard length, 5.8 in total length. Eye 4.1 in head from tip of upper jaw to branchial opening, 1.6 in postorbital length of head and equal to interorbital space. Upper jaw broader than long. Preorbital equal to eye diameter. Teeth in 3-4 bands in jaws. Origin of anal opposite to 2nd undivided ray of dorsal. Distance between origin of ventral and anal $\frac{1}{2}$ preorbital length shorter than distance between angle of jaws and gill opening. Base of dorsal slightly longer than base of anal. Pectoral half eye diameter longer than postorbital length of head. Ventral $\frac{3}{5}$ of pectoral, its origin midway between pectoral base and caudal base. Caudal deeply forked, median rays equal to eye diameter. Colour: Brownish above, pale yellowish below, each scale of back with dark brown spot posteriorly. A bluish silvery lateral band bordered by blackish above. Dorsal dusky, distal part of anterior rays darker. Caudal dusky. Pectoral and anal hyaline. Ventral hyaline, anterior rays slightly dusky basally.

Local name: *Oola* (Ameni).

Distribution: Known only from Natal Coast of Africa, Laccadives, Indonesia, Philippines and Ellice Islands.

117. *Hyporhamphus dussumieri* (Valenciennes)

Hemiramphus dussumieri Cuvier and Valenciennes, Hist. Nat. Poissons, 19, p. 33, pl. 520, 1846.

Hemiramphus dussumieri Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 155, 1922. Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 44, 1959.

Hemiramphus reynaldi Day, Fishes of India, p. 515, 1878.

Hyporhamphus dussumieri Smith, Fishes of Southern Africa, p. 127, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. OMFRI-LA-F. 47/82).

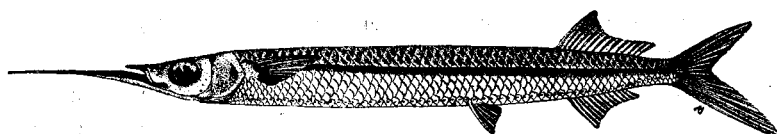


FIG. 117. *Hyporhamphus dussumieri* (Valenciennes), 227 mm.

Specimens studied: Agathi (22), 89 to 227 mm. Ameni (4), 127 to 215 mm. Bitra (4), 70 to 90 mm. Chetlat (6), 58 to 79 mm. Kadamat (6), 75 to 140 mm. Minicoy (18), 71 to 282 mm. Pitti (1), 88 mm.

D. ii, 12-13; A. ii, 12-13; P. i, 10-11; V. i, 5. Ll. 55-58.

Entire head 2.6-2.8 in standard length, 3.0-3.3 in total length. Head from tip of upper jaw to hind margin of opercular flap 3.3-3.7 in trunk. Body cylindrical, breadth of body equal to or slightly less than depth of body. Depth of body 10.0-11.4 in standard length, 11.6-13.2 in total length. Length of lower jaw beyond tip of upper jaw 5.4-5.8 in standard length, 6.2-6.8 in total length. Eye 3.4-3.7 in head, 1.2-1.3 in postorbital length of head and equal to interorbital space. Upper jaw broader than long. Jaws with 3-5 rows of teeth. Preorbital much shorter than eye. Origin of anal opposite to 1st or 2nd branched ray of dorsal. Distance between ventral and anal equal to distance between angle of jaws to gill opening. Length of anal base 1.3 in that of dorsal. Pectoral equal to head without snout or slightly shorter. Ventral about 3/5th of length of pectoral. Ventral origin nearer to caudal base than to pectoral axil. Colour: Greenish brown above becoming silvery below, scales of back and upper sides with dark brown spots. A bluish silvery lateral band bordered by blackish above. Lateral line scales with thin blackish streaks. Dorsal dusky, anterior rays darker distally; pectoral and anal hyaline; caudal dusky, ventral dusky basally, pale distally.

Local names: *Ethuntholi* (Minicoy). *Oola* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Malaysia, Ryukyu, Caroline and Society Islands.

Family EXOCOETIDAE

Body elongate and somewhat compressed. Maxillaries with a straight front margin. Jaws generally subequal, sometimes the lower jaw with a symphysial process and projects beyond the upper. Teeth minute in jaws, sometimes also on vomer, palatines, pterygoids and tongue. Gill membranes not united with isthmus. Pectorals greatly enlarged, the first one or two rays undivided. A single dorsal fin situated far back and opposite to anal. Ventrals abdominal, short or sometimes enlarged. Lateral line running low down.

1. At least first two rays of pectoral undivided *Prognichthys gibbifrons*
Only first ray of pectoral undivided 2
2. Teeth present on vomer and tongue. 39-40 lateral line scales *Parexocoetus brachypterus*
No teeth on vomer or tongue. More than 40 lateral line scales 3
3. Pectorals not reaching ventrals. Ventrals as long as half length of head.
Lower jaw prominent with a symphysial process *Oxyporhamphus micropterus micropterus*
Pectorals reaching beyond anal origin. Ventrals as long as or longer than head 4
4. Origin of anal opposite to that of dorsal. A single series of teeth in jaws *Hirundichthys oxycephalus*
Origin of anal far behind that of dorsal. Two or more rows of teeth in jaws 5
5. Several large black spots on pectoral *Cypselurus spilopterus*
No black spots on pectoral 6
6. Pectoral dark blue with an oblique hyaline band and a hyaline hind border *Cypselurus furcatus*
Pectoral without oblique hyaline band 7
7. 8-9 anal rays. Ll. 43-46. Predorsal scales 23-26. Teeth tricuspid. Anterior rays of dorsal at the most dusky *Cypselurus oligolepis*
10-11 anal rays. Ll. 53-58. Predorsal scales 35-39. Teeth simple. A bluish black blotch often between 3rd and 10th dorsal rays distally *Cypselurus cyanopterus*

118. *Prognichthys gibbifrons* (Valenciennes)

Exocoetus gibbifrons Cuvier and Valenciennes, Hist. Nat. Poissons, 19, p. 118, 1846.

Prognichthys gibbifrons Bruun, Dana Report, 6, p. 64, 1935. Munro, Fishes of Ceylon, p. 75, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 48/83).

Specimen studied: Agathi (1), 104 mm.

D. 11; A. 9; P. iv, 13; V. 6; Ll. 46; Ltr. $7\frac{1}{2}+1+2\frac{1}{2}$. GR. 7+19.

Head 4.2 in standard length, 5.5 in total length. Depth of body 5.1 in standard length, 6.7 in total length. Breadth of body less than 1.3 in its depth. Eye 3 in head, about 0.6 in snout and 1.2 in interorbital space. Teeth simple in jaws and none on the palatines. 25 predorsal scales. Pectoral reaching to end of dorsal fin. Ventral $1\frac{1}{2}$ eye diameter longer than head, reaching to the caudal peduncle and inserted nearer to operculum than to base of caudal. Anal base about 1.4 in base of dorsal, the first ray of anal below 4th dorsal ray. Colour: Greenish brown above, whitish below. Dorsal light greyish, 4th to 8th rays slightly darker distally. Pectoral dusky, more so posteriorly; 3-4 lower rays and extremity of upper 3 rays lighter. Ventral dark grey except first and last ray which are lighter; anal clear; caudal dusky.

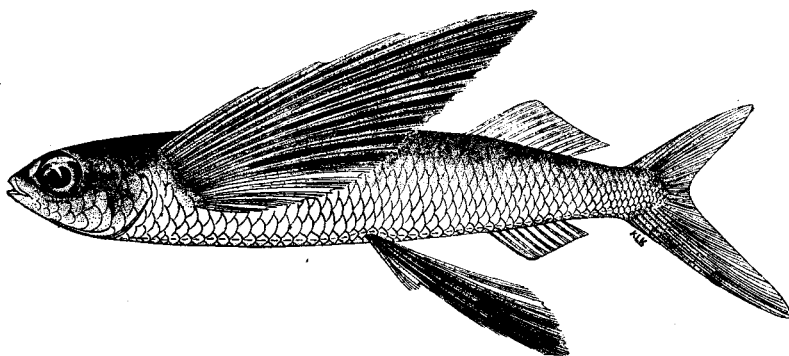


FIG. 118. *Prognichthys gibbifrons* (Valenciennes), 104 mm.

Local name: *Parava* (Agathi).

Distribution: Widely distributed in the Atlantic and recorded from New Guinea, New Ireland and New Britain in the Pacific and Ceylon and Laccadives in the Indian Ocean.

Note: First four rays of the pectoral are unbranched and there are 13 branched rays. Probably this is a juvenile character. In adults generally the upper two rays are undivided. Juveniles with four unbranched upper pectoral rays have been reported previously.

119. *Parexocoetus brachypterus* (Richardson)

Exocoetus brachypterus Richardson, Ichth. China and Japan, p. 265, 1846, on Solander's Ms. *Exocoetus mento* Day, Fishes of India, p. 520, pl. 121, fig. 9, 1878.

Parexocoetus brachypterus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 174, fig. 60, 1922. Smith, Fishes of Southern Africa, p. 126, pl. 7, fig. 215, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 48/84).

Specimens studied: Kiltan (3), 64 to 71 mm.

D. 10-11; A. 10-11; P. i, 11-12; V. 6. Ll. 39-40; Pred. 17-18.
GR. 6-7+1+21-23.

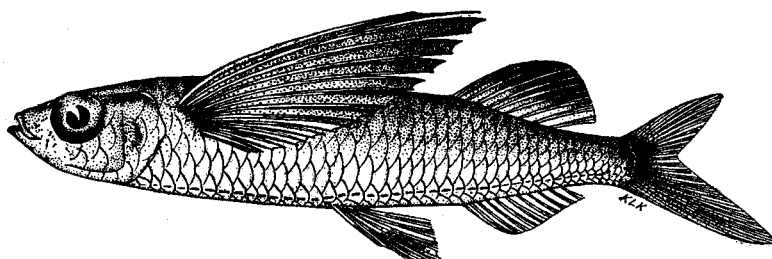


FIG. 119. *Parexocoetus brachypterus* (Richardson), 71 mm.

Head 3.8-4.2 in standard length, 4.9-5.4 in total length. Depth of body 4.6-4.9 in standard length, 5.9-6.3 in total length. Eye 2.5-2.8 in head, 0.6 in snout and equal to flat interorbital space. Lower jaw projecting beyond the upper, with a prominent symphysial knob. Teeth in jaws minute, in several rows; teeth on vomer and on tongue. Dorsal origin opposite to or slightly anterior to that of anal. Pectoral 2.0-2.2 times of head, nearly reaching middle of dorsal. Ventral shorter than head, scarcely reaching anal, its origin midway between front border of eye and base of caudal. Colour: Bluish brown above, silvery below. Dorsal fin pale at base, outer half blackish. Anal hyaline. Caudal pale to dusky, base of median rays dark. Pectoral with black dots, more dense posteriorly, lower edges pale. Ventral hyaline, distal part of median rays dusky.

Local name: *Parava* (Kiltan).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, China and Hawaiian Islands.

120. *Oxyporhamphus micropterus micropterus* (Valenciennes)

Exocoetus micropterus Cuvier and Valenciennes, Hist. Nat. Poissons, 19, p. 127, pl. 563, 1846. Day, Fishes of India, p. 518, 1878.

Evolantia micropterus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 176, fig. 61, 1922. Smith and Smith, Fishes of Seychelles, p. 9, pl. 5, C, 1963.

Hemirhamphus convexus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 159, fig. 57, 1922. (based on juvenile specimens).

Oxyporhamphus micropterus micropterus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 48/85).

Specimens studied: Bangaram (2), 61 and 79 mm. Kadamat (3), 121 to 148 mm. Kavarathi (1), 81 mm. Kiltan (5), 107 to 139 mm.

D. 13-14; A. 14-16; P. i, 10-11; V. 6. Ll. 49-52; Pred. 30-32.
GR. 7-8+1+23-25.

Head 4.2-4.5 in standard length, 5.4-5.8 in total length. Depth of body 5.5-6.0 in standard length, 7.0-7.6 in total length. Eye 3.3-3.5 in head, 0.7-0.8 in snout and about equal to interorbital space. Breadth of body about 1.5 in its depth. Lower jaw projecting beyond the upper, a small skinny flap below symphysis. Teeth in one or two rows in jaws, no teeth on vomer and tongue. Dorsal originating anterior to a level from the anal origin. Head 1.4-1.6 in length of pectoral, pectoral scarcely reaching ventral origin. Base of dorsal 5.5-6.0 in standard length and 1.2-1.4 in head. Ventral equal to half length of head, its origin nearer to base of caudal than to gill opening. Colour: Bluish brown above, silvery white below, a broad dark brown band from operculum to base of caudal. Pectoral blackish above, broadly edged with whitish below. Ventral hyaline, anterior rays dusky. Dorsal and anal slightly dusky, anal pale. Distal part of dorsal and distal part of anterior rays of anal dark in juvenile specimens.

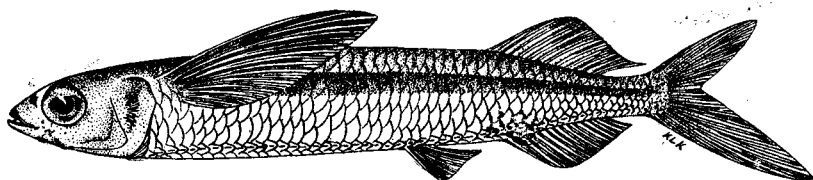


FIG. 120. *Oxyporhamphus micropterus micropterus* (Valenciennes), 139 mm.

Local name: *Parava* (other islands).

Distribution: Seychelles, Laccadives, coasts of India and from Indonesia to the Philippines, Australia and Fiji, Hawaiian and Galapagos Islands.

121. *Hirundichthys oxycephalus* (Bleeker)

Exocoetus oxycephalus Bleeker, Nat. Tijds. Ned.-Ind., 3, p. 771, 1852.

Cypsilurus oxycephalus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 181, 1922.

Hirundichthys oxycephalus Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 112, fig. 6, 1965, Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 6, 1969 (Cat. No. CMFRI-LA-F. 48/86).

Specimens studied: Androth (1), 132 mm. Kiltan (1), 161 mm.

D. 10-11; A. 10-11; P. i, 15; V. 6. Ll. 49-51; Ltr. $7\frac{1}{2}+1+2\frac{1}{2}$. Pred. 32-33. GR. 7+20-21.

Head 4.1-4.2 in standard length, 5.3-5.4 in total length. Depth of body 5.2-5.3 in standard length, 6.7-6.8 in total length. Breadth of body about 1.3 in its depth. Eye 3.0-3.2 in head, 0.7 in snout and about 1.3 in interorbital space. Teeth small, in a single series in jaws, palatines edentulous. Anal origin opposite to that of dorsal. Anal base 1.1-1.2 in base of dorsal. Pectoral reaching to end

of dorsal base or a little farther. Ventral about equal to head, reaching to middle of base of anal or farther and inserted midway between gill opening and base of caudal or a little nearer to the former. Colour: Brownish above, pale or whitish below. Pectoral dark with a narrow hyaline hind border and an oblique lighter area on lower third of fin. Caudal dusky. Other fins hyaline; proximal part of anterior 3-4 rays of ventral slightly dusky.

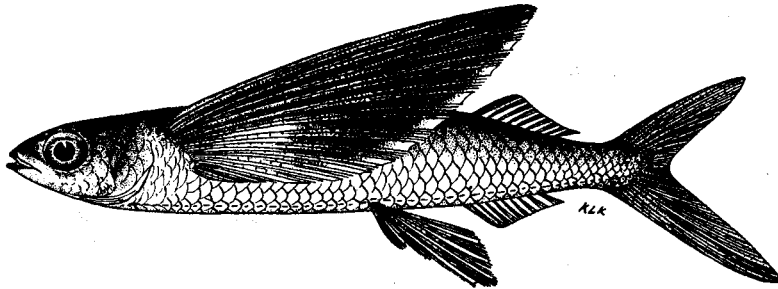


FIG. 121. *Hirundichthys oxycephalus* (Bleeker), 161 mm.
(after Jones and Kumaran)

Local name: *Parava* (other islands).

Distribution: Laccadives, Indonesia to the Torres Strait and Papua.

122. *Cypselurus spilopterus* (Valenciennes)

Exocoetus spilopterus Cuvier and Valenciennes, Hist. Nat. Poissons, 19, p. 113, 1846.

Exocoetus poecilopterus Day, Fishes of India, p. 518, pl. 120, fig. 4, 1878 (not of Cuvier and Valenciennes).

Cypselurus spilopterus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 48/87).

Cypsilurus spilopterus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 187, 1922.

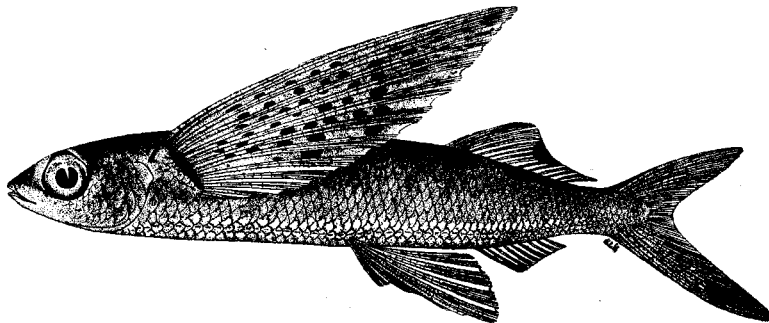


FIG. 122. *Cypselurus spilopterus* (Valenciennes), 248 mm.

Specimens studied: Agathi (2), 253 and 268 mm. Ameni (1), 270 mm. Androth (2), 287 and 300 mm. Bitra (1), 250 mm. Chetlat (2), 248 and 254 mm. Kadamat (2), 229 and 251 mm. Kalpeni (1), 170 mm. Minicoy (1), 285 mm.

D. 13-15; A. 10-11; P. i, 12-13. LI. 51-57; Ltr. $8\frac{1}{2}+1+3$; Pred. 32-36. GR. 5+16-17.

Head 4.0-4.5 in standard length, 5.2-5.7 in total length. Depth of body 5.0-5.3 in standard length, 6.5-6.9 in total length. Breadth of body about 1.4 in its depth. Eye 2.9-3.2 in head, 0.6-0.7 in snout and about 1.3 in slightly concave interorbital space. Teeth simple, in narrow bands in jaws and a small patch on palatines. Pectoral reaching to end of dorsal. Ventral longer than head, reaching to middle of anal and inserted midway between hind border of eye and caudal base or slightly nearer to the latter. Origin of anal below 6th dorsal ray. Anal base 1.6-1.7 in base of dorsal. Colour: Bluish brown above becoming whitish below. Dorsal pale and often with a dark blotch distally between 6th to 11th dorsal ray. Pectoral light bluish with several large black spots, lower and posterior edge hyaline. Anal and ventral hyaline, tips of median rays of ventral sometimes dark. Caudal dusky.

Local names: *Sikkifulanghi* (Minicoy). *Fulliparava* (other islands).

Distribution: Laccadives, coasts of India, Indoneisa and as far as Tahiti.

123. *Cypselurus furcatus* (Mitchill)

Exocoetus furcatus Mitchill, The Fishes of New York, Trans. Lt. Phil. Soc. N.Y., 1, p. 449, pl. 5, fig. 2, 1815. Day, Fishes of India, p. 519, 1878.

Cypselurus furcatus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 48/88).

Cypsilurus altipennis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 184, 1922.

Cypsilurus furcatus Smith, Fishes of Southern Africa, p. 125, fig. 211, 1949.

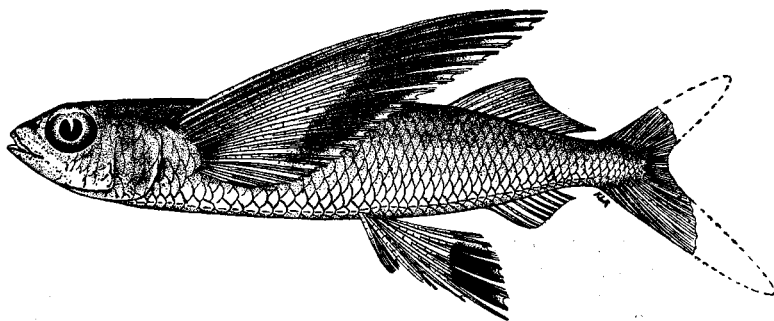


FIG. 123. *Cypselurus furcatus* (Mitchill), 190 mm.

Specimens studied: Ameni (3), 190 to 199 mm. Kiltan (4), 100 to 199 mm. Minicoy (2), 197 and 201 mm.

D. 12-13; A. 9-10; P. i, 13-15; V. 6. Ll. 46-49; Ltr. $8\frac{1}{2}+1+3$. Pred. 27-29. GR. 5-6+16-17.

Head 3.9-4.1 in standard length, 5.0-5.3 in total length. Depth of body 4.9-5.4 in standard length, 6.3-6.8 in total length. Eye 2.9-3.2 in head, 0.7 in snout and 1.2-1.3 in slightly concave interorbital space. Narrow bands of minute teeth in jaws. Anal origin opposite to 5th or 6th ray of dorsal. Pectoral reaching nearly to end of dorsal base. Ventral longer than head, reaching posterior to middle of anal, its origin nearer to base of caudal than to hind border of eye. Base of anal 1.6-1.7 in base of dorsal. Colour: Bluish brown above, silvery white below. Ground colour of pectoral dark blue with a broad oblique median transparent area and a transparent hind border. Dorsal pale to dusky. Ventral whitish, tips of median rays dark to blackish. Anal transparent. Caudal dusky.

Local names: *Fulanghi* (Minicoy). *Parava* (other islands).

Distribution: Tropical Atlantic and the Indo-Pacific.

124. *Cypselurus oligolepis* (Bleeker)

Exocoetus oligolepis Bleeker, Ned. Tijds. Dierk, 3, p. 109, 1866.

Cypselurus oligolepis Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 111. fig. 5, 1965.

Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 48/89).

Cypsilurus oligolepis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 189, 1922.

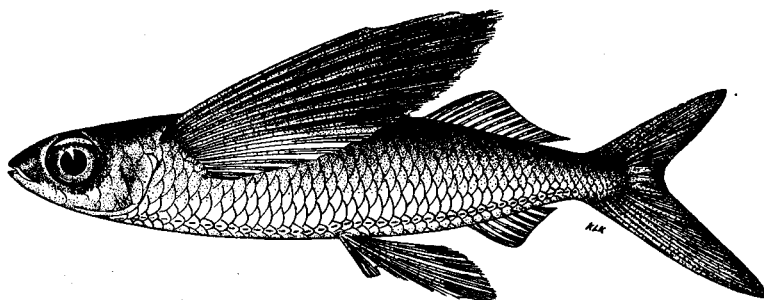


FIG. 124. *Cypselurus oligolepis* (Bleeker), 136 mm.
(after Jones and Kumaran)

Specimens studied: Androth (2), 147 and 151 mm. Chetlat (1), 136 mm. Kadamat: (2), 132 and 137 mm.

D. 12-13; A. 8-9; P. i, 13-14; V. 6. Ll. 43-46; Ltr. $8\frac{1}{2}+1+2\frac{1}{2}$. Pred. 23-26. GR. 5-6+16-17.

Head 3.8-4.2 in standard length, 5.2-5.6 in total length. Depth of body 4.6-4.9 in standard length, 6.1-6.5 in total length. Breadth of body 1.4-1.5 in its depth. Eye 2.6-2.8 in head, 0.5-0.6 in snout and 1.2-1.3 in somewhat concave interorbital space. 2 or 3 rows of small tricuspid teeth in jaws and an elongate patch of teeth on palatines. Origin of anal below 6th to 7th dorsal ray. Pectoral reaching to posterior third of dorsal. Ventral longer than head, reaching to middle of anal, its origin midway between hind border of eye and base of caudal. Colour: Bluish brown above, silvery below. Pectoral blackish, tip of fin and 4-5 lower rays hyaline. Caudal a little dusky. Dorsal hyaline, anterior two rays often slightly dusky. Ventral and anal transparent.

Local name: *Parava* (other islands).

Distribution: Muscat, Zanzibar, Laccadives, Malaysia to Indonesia, Philippines, China and eastwards as far as Solomon and Tahiti Islands.

125. *Cypselurus cyanopterus* (Valenciennes)

Exocoetus cyanopterus Cuvier and Valenciennes, Hist. Nat. Poissons, **19**, p. 97, 1846.

Cypselurus cyanopterus Jones and Kumaran, J. Mar. biol. Ass. India, **7**, p. 111, fig. 4, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 7, 1969 (Cat. No. CMFRI-LA-F. 48/90).

Cypsilurus cyanopterus Bruun, Dana Report, **6**, p. 40, pl. 3, fig. 1, 1935.

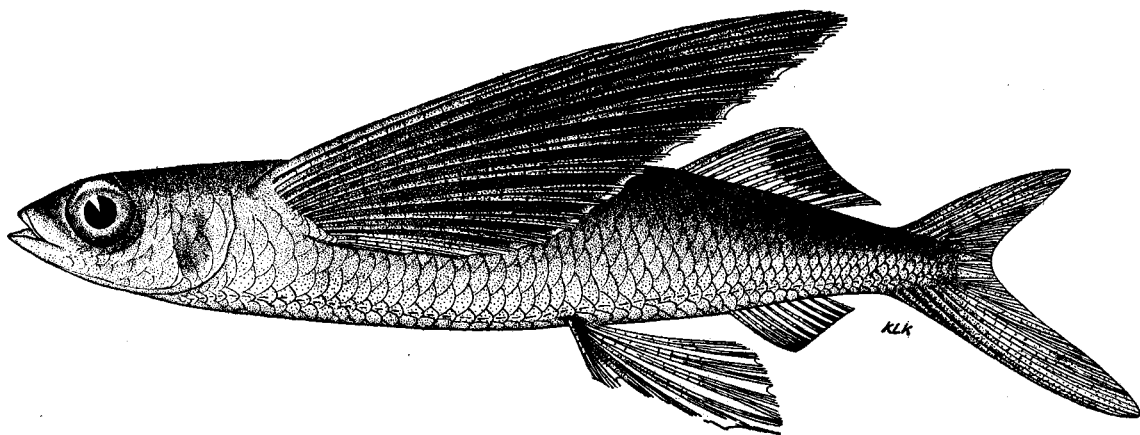


FIG. 125. *Cypselurus cyanopterus* (Valenciennes), 235 mm.
(after Jones and Kumaran)

Specimens studied: Androth (1), 243 mm. Bitra (1), 240 mm. Chetlat (1), 235 mm. Kadamat (2), 230 and 238 mm. Kalpeni (1), 228 mm. Kavarrathi (2), 242 and 245 mm.

Specimens studied: Ameni (3), 190 to 199 mm. Kiltan (4), 100 to 199 mm. Minicoy (2), 197 and 201 mm.

D. 12-13; A. 9-10; P. i, 13-15; V. 6. Ll. 46-49; Ltr. $8\frac{1}{2}+1+3$. Pred. 27-29. GR. 5-6+16-17.

Head 3.9-4.1 in standard length, 5.0-5.3 in total length. Depth of body 4.9-5.4 in standard length, 6.3-6.8 in total length. Eye 2.9-3.2 in head, 0.7 in snout and 1.2-1.3 in slightly concave interorbital space. Narrow bands of minute teeth in jaws. Anal origin opposite to 5th or 6th ray of dorsal. Pectoral reaching nearly to end of dorsal base. Ventral longer than head, reaching posterior to middle of anal, its origin nearer to base of caudal than to hind border of eye. Base of anal 1.6-1.7 in base of dorsal. Colour: Bluish brown above, silvery white below. Ground colour of pectoral dark blue with a broad oblique median transparent area and a transparent hind border. Dorsal pale to dusky. Ventral whitish, tips of median rays dark to blackish. Anal transparent. Caudal dusky.

Local names: *Fulanghi* (Minicoy). *Parava* (other islands).

Distribution: Tropical Atlantic and the Indo-Pacific.

124. *Cypselurus oligolepis* (Bleeker)

Exocoetus oligolepis Bleeker, Ned. Tijds. Dierk, 3, p. 109, 1866.

Cypselurus oligolepis Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 111, fig. 5, 1965.

Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 48/89).

Cypsilurus oligolepis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 189, 1922.

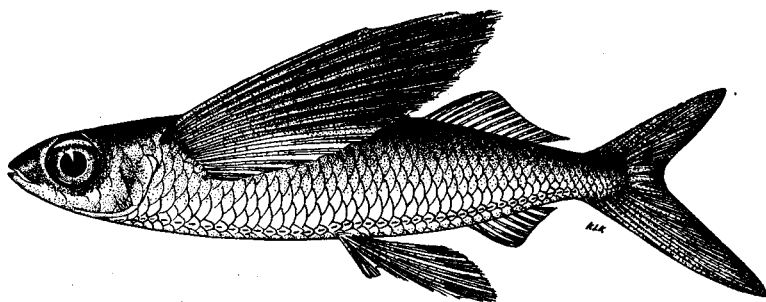


FIG. 124. *Cypselurus oligolepis* (Bleeker), 136 mm.
(after Jones and Kumaran)

Specimens studied: Androth (2), 147 and 151 mm. Chetlat (1), 136 mm. Kadamat: (2), 132 and 137 mm.

D. 12-13; A. 8-9; P. i, 13-14; V. 6. Ll. 43-46; Ltr. $8\frac{1}{2}+1+2\frac{1}{2}$. Pred. 23-26. GR. 5-6+16-17.

Head 3.8-4.2 in standard length, 5.2-5.6 in total length. Depth of body 4.6-4.9 in standard length, 6.1-6.5 in total length. Breadth of body 1.4-1.5 in its depth. Eye 2.6-2.8 in head, 0.5-0.6 in snout and 1.2-1.3 in somewhat concave interorbital space. 2 or 3 rows of small tricuspid teeth in jaws and an elongate patch of teeth on palatines. Origin of anal below 6th to 7th dorsal ray. Pectoral reaching to posterior third of dorsal. Ventral longer than head, reaching to middle of anal, its origin midway between hind border of eye and base of caudal. Colour: Bluish brown above, silvery below. Pectoral blackish, tip of fin and 4-5 lower rays hyaline. Caudal a little dusky. Dorsal hyaline, anterior two rays often slightly dusky. Ventral and anal transparent.

Local name: *Parava* (other islands).

Distribution: Muscat, Zanzibar, Laccadives, Malaysia to Indonesia, Philippines, China and eastwards as far as Solomon and Tahiti Islands.

125. *Cypselurus cyanopterus* (Valenciennes)

Exocoetus cyanopterus Cuvier and Valenciennes, Hist. Nat. Poissons, 19, p. 97, 1846.

Cypselurus cyanopterus Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 111, fig. 4, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 48/90).

Cypsilurus cyanopterus Bruun, Dana Report, 6, p. 40, pl. 3, fig. 1, 1935.

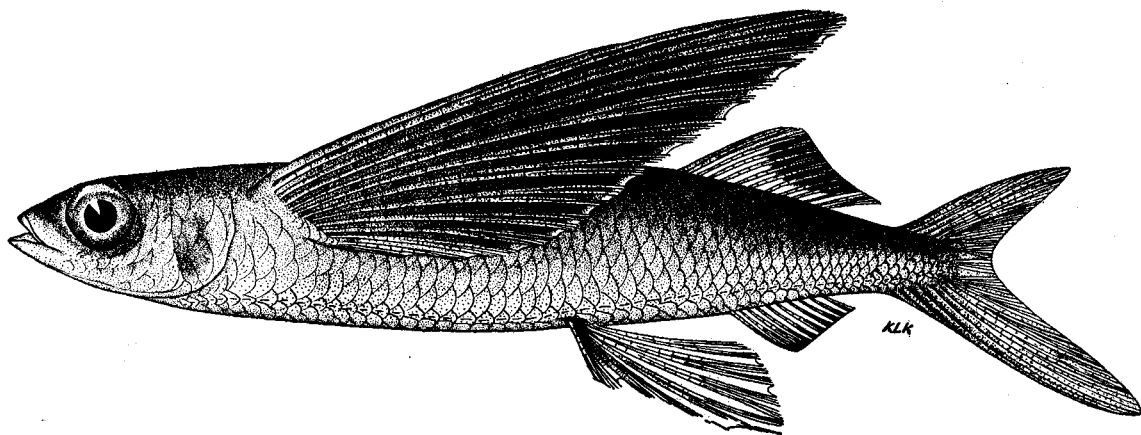


FIG. 125. *Cypselurus cyanopterus* (Valenciennes), 235 mm.
(after Jones and Kumaran)

Specimens studied: Androth (1), 243 mm. Bitra (1), 240 mm. Chetlat (1), 235 mm. Kadamat (2), 230 and 238 mm. Kalpeni (1), 228 mm. Kavarathi (2), 242 and 245 mm.

D. 12-13; A. 10-11; P. i, 12-13; V. 6. Ll. 52-58; Ltr. $8\frac{1}{2}+1+3$; Pred. 35-39. GR. 7-8+16-18.

Head 4.2-4.4 in standard length, 5.4-5.7 in total length. Depth of body 5.1-5.3 in standard length, 6.6-6.9 in total length. Eye 3.0-3.3 in head, about 0.7 in snout and 1.2-1.3 in slightly concave interorbital space. Teeth simple in 2-3 rows in jaws and a small patch on palatines. Origin of anal opposite to 5th or 6th ray of dorsal. Base of anal more or less than 1.5 in base of dorsal. Pectoral reaching nearly to end of dorsal. Ventral $\frac{1}{2}$ eye diameter longer than head, its origin midway between gill opening and base of caudal. Distance between origin of ventral and origin of anal about $\frac{2}{3}$ eye diameter shorter than head. Colour: Blackish above, silvery white below. Dorsal with a bluish black blotch generally between 3rd and 10th ray. Pectoral bluish black, more so in posterior third, lower and posterior border narrowly edged with white. Ventral transparent, first ray often slightly dusky; in one specimen tips of median rays dusky. Caudal lobes dusky. Anal hyaline.

Local name: *Karuthaparava* (other islands).

Distribution: Widespread in the tropical Atlantic and recently recorded from the Laccadives.

Note: Some of the previous records of *Cypselurus bahiensis* = *C. comatus* from the Indian Ocean are probably of this species.

Order MACROURIFORMES

Tail elongate and tapering to a point without caudal fin. Olfactory lobes situated at the forebrain. The short first dorsal fin sometimes with a spine which is usually serrated behind; the soft dorsal and anal confluent around tail. Ventrals below or in advance of base of pectoral with 15-17 rays.

Family MACROURIDAE

Trunk short, tail elongate and tapering. Dorsal and anal long, confluent around tail. The dorsal with or without a separate spinous portion; the second spine of spinous part normally prolonged and serrated. Ventrals below or somewhat behind base of pectorals usually with 7-12 rays. Scales cycloid, carinate or spiniferous. Lateral line distinct. Mouth protractile, terminal, subterminal or inferior. Sometimes a symphysial barbel below lower jaw. Teeth usually small in a single series in jaws or in villiform bands.

1. Snout not projecting beyond the mouth. Teeth in jaws villiform. Second dorsal ray not spiniform 2
Snout greatly or slightly projecting beyond the mouth. Mouth terminal, subterminal or inferior. Second dorsal ray spiniform and sometimes serrated 3
2. Barbels absent. Interorbital space greater than eye diameter. Rays of dorsal, pectoral and ventral not greatly prolonged *Bathygadus furvescens*
Barbel long, slender. Interorbital space equal to eye diameter. Second spine of dorsal, upper ray of pectoral and outer ray of ventral greatly prolonged *Bathygadus multifilis*
3. Snout greatly produced. Head with ridges. Suborbital ridge reaching to preopercle and angulated 4
Snout not or slightly produced. No marked spiny ridges on head 5
4. Scales on body with 3-5 parallel keels. Second spine of first dorsal longer than snout *Coelorhynchus parallelus*
Scales on body with 8 radiating ridges. Second spine of first dorsal slightly shorter than snout *Coelorhynchus flabellispinis*
5. 11-13 ventral rays. Snout only slightly produced beyond the mouth *Lionurus pumiliceps*
7-10 ventral rays 6
6. 10 ventral rays. Interdorsal distance equal to head without snout *Macrourus nasutus*
7-8 ventral rays. Interdorsal distance shorter than postorbital length of head 7
7. 7 ventral rays. Snout blunt, not longer than eye *Macrourus hextii*
8 ventral rays. Snout sharp, longer than eye *Macrourus wood-masoni*

126. *Bathygadus furvescens* Alcock

Bathygadus furvescens Alcock, J. Asiat. Soc. Bengal, 6 (2), p. 128, 1894. Alcock, Illus. Zool. Investigator, pl. 16, fig. 1, 1895. Norman, John Murray Exped., 7, p. 47, 1939. Munro, Fishes of Ceylon, p. 77, pl. 14, fig. 211, 1955.

Bathygadus (Bathygadus) furvescens Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 19, 1929.

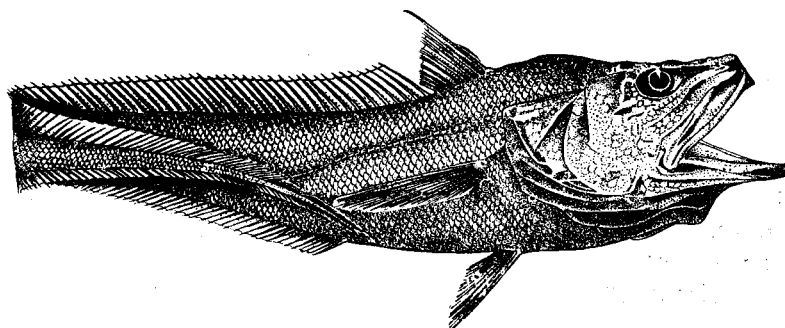


FIG. 126. *Bathygadus furvescens* Alcock. (after Alcock)

D. II, 8-9; P. 15; V. 8.

Head about 5 in total length. Depth of body about $\frac{3}{4}$ of head. Eye about 5 in head, 1.2-1.4 in snout and 1.2-1.3 in interorbital space. No mandibular barbel. Mouth wide, cleft reaching vertical through posterior border of eye. Villiform teeth in bands in jaws only, a narrow area at symphysis of both jaws edentulous. Gill openings wide, gill membranes free. Hind border of operculum with two weak spines. Seven rows of scales between base of first dorsal and lateral line. First dorsal fin slightly behind vertical from hind border of operculum and the second dorsal arising immediately behind it. Second spine of dorsal about half length of head. Rays of anal fin shorter than that of second dorsal. Pectoral equal to or a little longer than postorbital length of head and extending beyond origin of anal. Ventral fin below the base of pectoral, outer ray slightly produced, about equal to postorbital part of head. Colour: Dusky brown; branchial and buccal cavities black; all fins blackish.

Distribution: Indian Ocean and Western Pacific.

127. *Bathygadus multifilis* Günther

Bathygadus multifilis Günther, Challenger Rep. Deep Sea Fish., p. 155, pl. 42, Fig. B, 1887.

Bathygadus longifilis Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 302. Alcock, Cat. Indian Deep Sea Fish., p. 120, 1899, (not of Goode and Bean).

Bathygadus (Gadomus) multifilis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 23, 1929.

D₁. II, 7-9; D₂. 130-140; P. 15-17; V. 8; GR. 5-7+24-30.

Head soft, compressed, not elevated. Body greatly elongated, tapering gradually to the tip of tail. Eye oval, 4.2-4.6 in head, 1.2 in snout and equal to interorbital space. Mouth terminal, maxillary reaching slightly behind vertical from hind border of eye. Teeth minute in narrow bands. Gill rakers long and

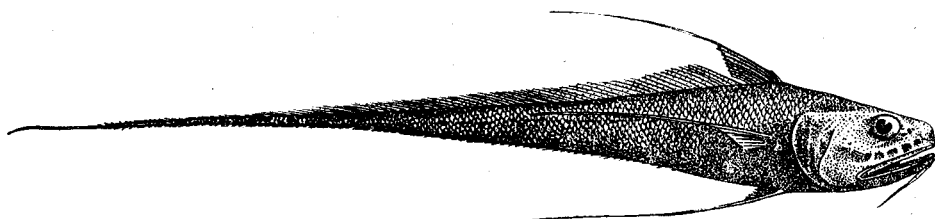


FIG. 127. *Bathygadus multifilis* Günther. (after Günther)

slender. Barbel slender, equal to or slightly longer than half length of head. Six scales between lateral line and origin of second dorsal. First dorsal with filamentous second dorsal ray, equal to twice head length, other rays low. First pectoral ray and first ventral ray produced, about twice length of head. Origin of first dorsal above base of pectoral. Second dorsal origin close to first dorsal. Colour: Brownish; lower part of head, abdomen and fins blackish.

Distribution: East African coast, Arabian Sea, Laccadive Sea, Bay of Bengal, Andaman Sea, Indonesia and near Philippine Islands and Japan.

128. *Coelorhynchus parallelus* (Günther)

Macrurus parallelus Günther, Ann. Mag. Nat. Hist., (4) 20, p. 439, 1877. Alcock, Descript. Cat. Indian Deep Sea Fishes, p. 106, 1899.

Coelorhynchus parallelus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 53, 1969. Smith, Fishes of Southern Africa, p. 132, fig. 232, 1949. Munro, Fishes of Ceylon, p. 78, pl. 14, fig. 214, 1955.

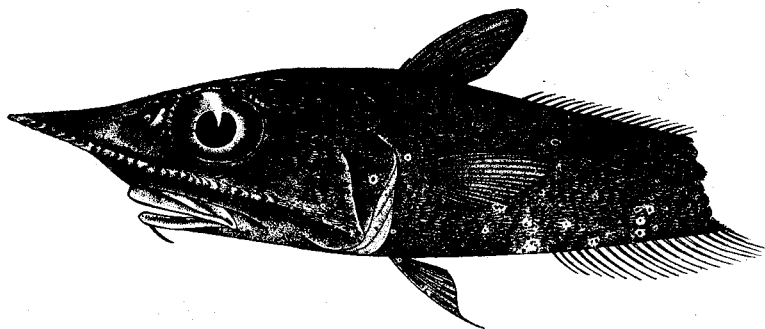


FIG. 128. *Coelorhynchus parallelus* (Günther).

Specimen studied: Kavarathi (1, damaged specimen), head length 124 mm.

D₁. II, 9; A. 80-90; P. 18.

Snout pointed, its dorsal side somewhat straight and lateral side slightly convex. Snout 2.4 in head. Eye 4.3 in head, about 1.8 in snout and slightly more than interorbital space. Mouth inferior, maxilla reaching to a level from hind border of pupil. Infraorbital ridge with strong spinulated keels, reaching to border of preoperculum. Supraorbital ridge keeled, reaching to upper angle of operculum. Median rostral ridge reaching to a line from front border of eyes. On each side of interorbital space a ridge with keeled scales extend to end of head. Lower side of head with small scales. Scales of head and body strongly spinose. Barbel 2/5 in eye diameter. Teeth in villiform bands in jaws. Five scales between first dorsal and lateral line. Second spine of first dorsal weak, filamentous in distal part, equal to snout. The interspace between the two dorsal fins slightly more than the length of base of first dorsal. Pectoral slightly longer than postorbital length of head. Ventral slightly shorter than pectoral. Colour: Uniform brown. Dorsal, pectoral and ventral fins slightly darker.

Distribution: Off the east coast of Africa, Laccadives, Gulf of Mannar, Indonesia, off Philippines, Seas of Japan, off Kermadec Islands, off New Zealand and near Hawaiian Islands.

129. *Coelorhynchus flabellispinis* (Alcock)

Macrurus flabellispinis Alcock, J. Asiat. Soc. Bengal, 63 (2), p. 123, 1894. Alcock, Illus. Zool. Investigator, pl. 16, fig. 2, 1895.

Macrurus (*Coelorhynchus*) *flabellispinis* Brauer, *Valdivia Tiefsee-Fische*, p. 258, 1906.

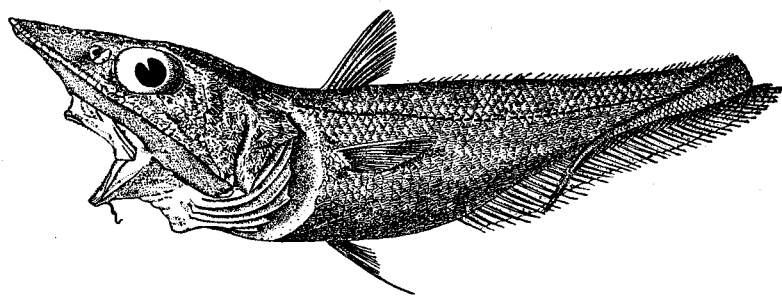


FIG. 129. *Coelorhynchus flabellispinis* (Alcock). (after Alcock)

D₁. II, 8; A. 95; P. 16; V. 7.

Head deeper and broader than body and slightly more than half length of tail. Eye about 4.4 in head and about 1.8 in acutely pointed snout. The nostril on each side is a large pit with an anterior small opening and a much larger

posterior opening. Mouth quite inferior, maxilla reaching almost to below hind border of eye. Teeth in narrow villiform bands in jaws. Barbel slender, about half diameter of eye. Suborbital ridge extending to preopercle. First spine of first dorsal a mere tubercle; the second slightly shorter than the snout a smooth; the interspace between the two dorsal fins and slightly more than the length of base of first dorsal. Pectoral slightly shorter than postorbital length of head. Outer ventral ray prolonged, almost equal to longest pectoral ray. Scales of head with four to eight radiating spiny ridges. Scales of body usually with eight radiating spiny ridges. Four rows of scales between base of first dorsal and lateral line. Colour: Dark grey; branchiostegal region and fins blue black.

Distribution: Widespread in the Indian Ocean.

130. *Lionurus pumiliceps* (Alcock)

Macrurus pumiliceps Alcock, J. Asiat. Soc. Bengal, 63 (2), p. 125, 1894. Alcock, Illus. Zool. Investigator, pl. 16, fig. 3, 1895.

Lionurus pumiliceps Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 78, 1929.

Macrurus (Macrurus) pumiliceps Brauer, *Valdivia Tiefsee-Fische*, p. 262, 1906.

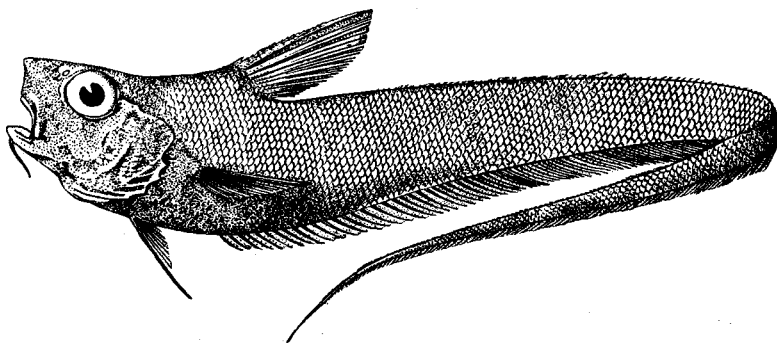


FIG. 130. *Lionurus pumiliceps* (Alcock). (after Alcock)

D. II, 11-13; P. 20-23; V. 11-13.

Head deep, a little more than greatest depth of body, 8 in total length. Tail tapering, lash-like. Eye more than 3 in head, a little more than snout and about 0.8 in interorbital space. Snout trihedral with strong median and lateral tubercles. Mouth small and quite inferior, the maxilla extending slightly behind front border of eye. Barbel about $\frac{3}{4}$ eye diameter. Villiform teeth in bands in jaws. First dorsal spine rudimentary; second spine about equal to head and sharply serrated. The rays of the second dorsal fin are short and slender; those of the anal are remarkably long and stout. Ventral inserted before a vertical

from the hind border of operculum. Outermost ventral ray is slightly prolonged, equal to the postorbital part of head. Scales on head and body small, those on head with rough radiating ridges and those on body with five or six almost parallel rows of slender spinules. Colour; Silvery grey; branchiostegal membranes, belly and paired fins blackish.

Distribution: Off the east coast of Africa in the Indian Ocean to the Philippines in the Pacific.

• 131. **Macrourus nasutus** (Günther)

Coryphaenoides nasutus Günther, Ann. Mag. Nat. Hist., 20, p. 440, 1877.

Macrurus brevirostris Alcock, Ann. Mag. Nat. Hist., (6) 4, p. 393, 1889. Alcock, Illus. Zool. Investigator, pl. 13, fig. 3, 1899.

Macrurus nasutus Günther, Challenger Rep. Deep Sea Fish., 22, p. 132, pl. 30, fig. B, 1887. Alcock, Ann. Mag. Nat. Hist., (6) 8, p. 121, 1891.

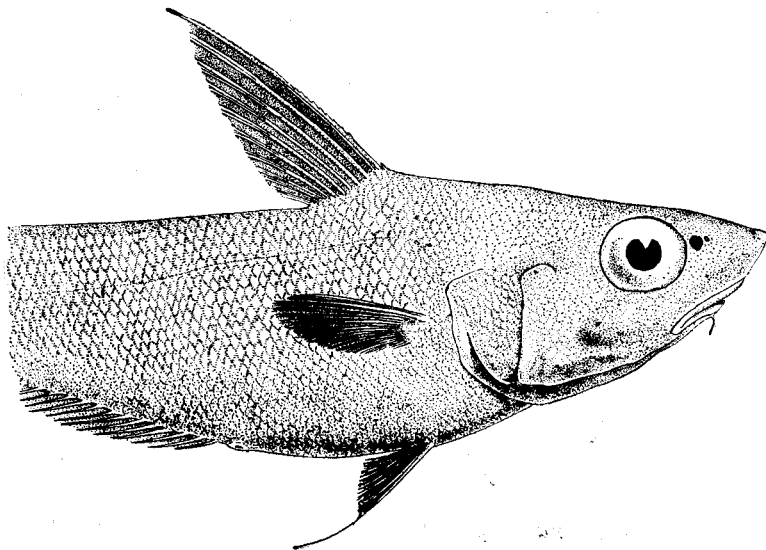


FIG. 131. *Macrurus nasutus* (Günther). (after Günther)

D₁. II, 10; D₂. 95; A. 110; P. 19-20; V. 10.

Head large, tail gradually tapering. Snout obtusely pointed with a projecting median tubercle. Eye 3-4 in head and equal to or shorter than snout. Mouth inferior. Cleft of mouth reaching vertical from front border of eye. Bands of villiform teeth in jaws, the outer two rows in upper jaw enlarged. Barbel very small. First dorsal spine minute; second spine produced, about equal to head, its anterior surface with upwardly directed barbs. Second dorsal origin

separated from first dorsal by interspace equal to head without snout. Ventral with the first ray produced, as long as postorbital length of head with half eye diameter. Scales very rough, those on head small, uniformly large on body; spinelets on scales densely packed and subequal in size. 7 or 8 scales between dorsal and lateral line. Colour: Grey; throat, abdomen, ventrals and pectorals blackish.

Distribution: Laccadive Sea, Andaman Sea and Seas of Japan.

132. *Macrourus hextii* Alcock

Macrurus Hextii Alcock, Ann. Mag. Nat. Hist., (6), 6, p. 299, 1890. Alcock, Ibid., (6), 10, p. 351, 1892. Alcock, Illus. Zool. Investigator, pl. 12, fig. 3, 1894.

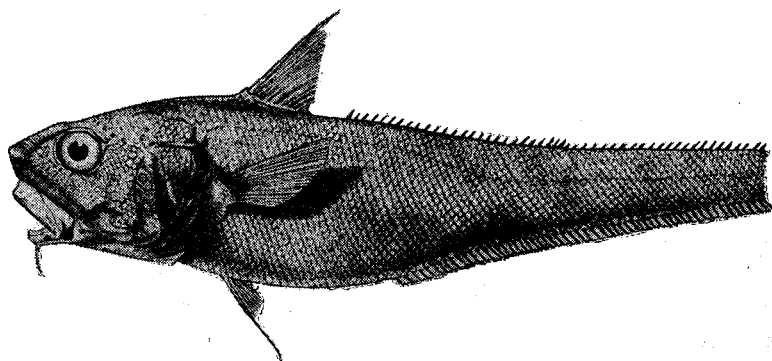


FIG. 132. *Macrourus hextii* Alcock. (after Alcock)

D₁. II, 10; D₂. about 110; A. about 110; P. 21-22; V. 7. Llat. about 130.

Head 5 in total length and slightly more than depth of body. Tail rapidly tapering posteriorly. Snout about 4 in head, equal to eye and also to flat interorbital space. Mouth inferior, maxilla almost reaching level of middle of eye. Teeth in broad villiform bands in jaws, inner row in the upper and outer row in the lower jaw enlarged. Barbel about $\frac{3}{4}$ diameter of eye. Head and body with deciduous spinigerous scales. First dorsal spine rudimentary; the second slightly prolonged, its front edge serrated. Second dorsal spine shorter than head without snout. Interspace between first and second dorsal fins equal to the length of base of first dorsal or a little more than length of snout. Pectoral more than half length of head. Ventrals with the first ray slightly produced, reaching to origin of anal. Colour: Chocolate; lower part of head and abdomen black; fins blackish.

Distribution: Laccadive Sea.

133. *Macrourus wood-masoni* Alcock

Macrurus Wood-Masoni Alcock, Ann. Mag. Nat. Hist., (6), 6, p. 301, 1890. Alcock, Ibid., (6), 8, p. 121, 1891. Alcock, Ibid., (6), 10, p. 353, 1892. Alcock, Illus. Zool. Investigator, pl. 13, fig. 1, 1894. Munro, Fishes of Ceylon, p. 77, pl. 14, fig. 213, 1955.

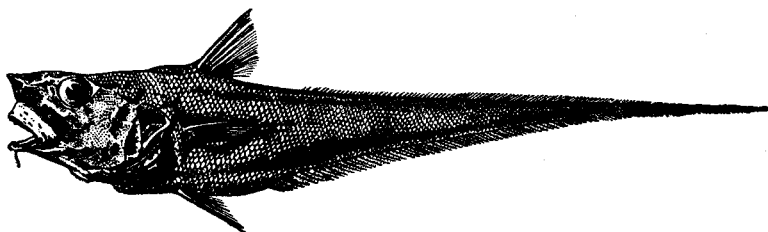


FIG. 133. *Macrourus wood-masoni* Alcock. (after Alcock)

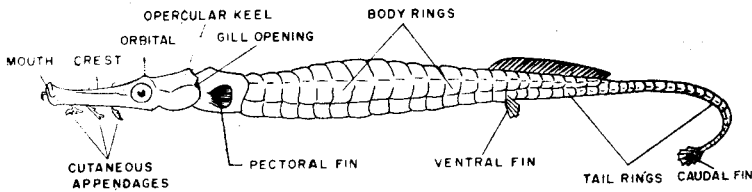
D₁. II, 9; D₂, about 100; A. about 105; P. 21; V. 8. Llat. about 130; Ltr. 4+1+22.

Body compressed, tail long and tapering. Head 4.5-4.7 in total length. Depth of body about $\frac{3}{4}$ length of head. Snout with strong median and lateral tubercles. Eye 4 in head, little less than snout and equal to interorbital space. Mouth inferior, maxilla reaching behind vertical from anterior border of eye. Small conical teeth in broad bands in jaws. Barbel shorter than eye diameter. First dorsal spine rudimentary; the second equal to or a little longer than half length of head and with numerous barbs along its front edge. Interspace between dorsal fins about half length of head. Ventrals with the outer ray slightly prolonged, reaching to origin of anal. Colour: Chocolate; lower side of head, chest and fins blackish.

Distribution: Arabian Sea off Konkan Coast of India, Laccadive Sea and Gulf of Mannar.

Order SYNGNATHIFORMES

Physoclastic. Rays of dorsal, anal and pectoral fins undivided. Ventral fins when present, abdominal or subabdominal. Mouth terminal. Snout tubular. Vomer, mesethmoid and quadrate very much elongate. Body normally with protective bony sheath or encased in bony rings.



F|7. E. Explanation of external characters of pipe fish.

1. Minute teeth present; body scaled or naked; lateral line present 2
 No teeth; body covered with dermal plates; no lateral line 3
2. Body compressed, scaly; dorsal fin with spinous and soft parts; vent far behind ventrals **AULOSTOMIDAE**
 Body depressed, without scales; a soft dorsal fin only; vent close to ventrals **FISTULARIIDAE**
3. Two dorsal fins, the first spinous and elevated; ventral fins present; body with a series of stellate bony plates **SOLENOTOMIDAE**
 Soft dorsal fin only; ventral fins absent; bony plates forming rings around body **SYNGNATHIDAE**

Family AULOSTOMIDAE

Elongate subcylindrical. Snout compressed and produced into a tube, lower jaw prominent. A small barbel present below symphysis of lower jaw. Jaws small; no teeth on intermaxillaries; a small patch of teeth close to symphysis of lower jaw; an elongate patch of teeth on vomer. Spinous dorsal consisting of small weak spines; soft dorsal and anal higher and opposed. Ventral below middle of spinous dorsal. Four branchiostegals. Scales small, ctenoid. Lateral line continuous.

134. *Aulostomus chinensis* (Linnaeus)

Fistularia chinensis Linnaeus, Syst. Nat., ed. 12, p. 515, 1766.

Aulostoma chinensis Munro, Fishes of Ceylon, p. 80, pl. 14, fig. 215, 1955.

Aulostoma valentini Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 10, fig. 3, 1922.

Aulostomus chinensis Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 51/91).

Aulostomus valentini Smith, Fishes of Southern Africa, p. 170, fig. 360, 1949. Smith and Smith, Fishes of Seychelles, p. 11, pl. 5, M, 1963.

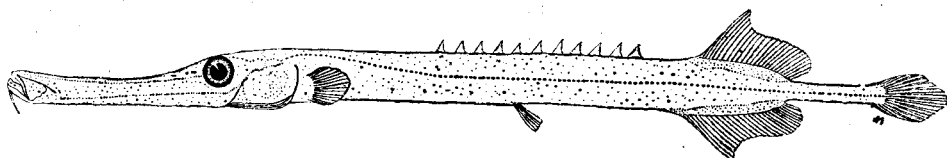


FIG. 134. *Aulostomus chinensis* (Linnaeus), 184 mm.

Specimens studied: Kavarathi (2), 184 and 260 mm.

D. XI, 27-28; A. 27-28; P. 16-17; V. 6.

Elongate, head and body notably compressed, especially the snout. Head 3 in standard length, 3.25 in total length. Depth of body 12.5-15.0 in standard length, 13.5-16.5 in total length. Eye 10.2-10.5 in head, 7.0-7.2 in tubiform snout and slightly more than flat interorbital space. Lower jaw prominent. Symphyseal barbel of lower jaw as long as eye diameter. Spinous dorsal of weak isolated spines. Origin of spinous dorsal nearer to front border of eye than to insertion of soft dorsal. Ventral origin nearer to front border of eye than to base of caudal. Pectoral about 1.7 eye diameter in length. Scales small, ctenoid. Head naked. Lateral line continuous, arched above hind part of opercle and base of pectoral. Colour: The smaller specimen is uniform yellowish. Larger specimen is uniform brownish with several narrow light cross-bars; a dark streak along bases of dorsal and anal fins; a dark spot in upper and lower margin of caudal fin and a dark spot at insertion of each pelvic fin.

Distribution: Mozambique to Madagascar, Seychelles, Laccadives, Ceylon, Indonesia, Philippines, China, Japan, Hawaiian Islands, east to Samoan, Tahiti and Tuamotu Islands.

Family FISTULARIIDAE

Body very much elongate, depressed. Snout tubular; lower jaw prominent. Minute teeth present on intermaxillaries, mandibularies and pterygoids. A single dorsal fin situated far back, opposite to anal. Middle caudal rays produced into a long filament. Body naked or covered with minute spinules and a single series of scales before and behind the dorsal and anal. Lateral line deflected between pectoral and ventral and running along the middle of side and continued on to the caudal filament.

135. *Fistularia petimba* Lacépède

Fistularia petimba Lacépède, Hist. Nat. Poissons, 5, p. 349, pl. 18, fig. 3, 1803. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 14, fig. 4, 1922. Smith, Fishes of Southern Africa, p. 171, pl. 12, fig. 361, 1949. Munro, Fishes of Ceylon, p. 80, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 52/92).

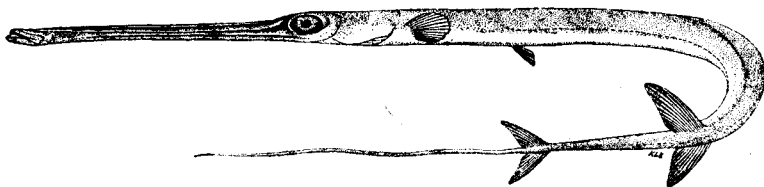


FIG. 135. *Fistularia petimba* Lacépède, 460 mm.

Specimens studied: Agathi (5), 120 to 585 mm. Ameni (3), 130 to 170 mm. Androth (1), 230 mm. Bitra (1), 210 mm. Chetlat (4), 118 to 295 mm. Kavarathi (6), 240 to 395 mm. Minicoy (18), 108 to 960 mm.

D. 15-16; A. 14-15; P. i, 14; V. 6.

Skin smooth. Head 2.5-2.9 in standard length. Depth of body 34-37 in standard length and about twice in width of body. Eye 10.8-13.0 in head, 8.0-10.2 in snout and about 0.4-0.5 in nearly flat interorbital space. Maxillary equal to or longer than eye diameter. A ridge on either side of snout serrated. Median ridges on upper surface of snout converging anteriorly. No median scales before and behind dorsal and anal. Colour: Bluish brown above, lighter to dirty white below. Edges of dorsal, anal and caudal slightly dark.

Local names: *Digunagutholi* (Minicoy). *Chukkanthatti* (other islands).

Distribution: Widely distributed from the east coast of Africa to the Lacadives, coasts of India, Ceylon, Indonesia, north of China and Japan, South to Australia and east to the west coast of tropical America.

Family SOLENOSTOMIDAE

Body compressed with a short tail and long caudal fin. Snout produced into a compressed tube; mouth small, terminal and directed obliquely upwards. Teeth absent. Gill openings wide. Four gills; pseudobranchiae large. Longitudinal and transverse series of ossifications on sides leaving the interspaces naked. Two dorsal fins, the first of flexible spines and the second with unbranched rays. Anal opposite to dorsal with unbranched rays. Pectorals very short with broad base. Ventrals abdominal, with one flexible spine and six branched rays; the fins free in the male but in the female the upper margins adnate to the abdomen, the lower margins united basally and form a brood pouch.

136. *Solenostomus cyanopterus* Bleeker

Solenostoma paradoxum Bleeker, Nat. Tijds. Ned.-Ind., 3, p. 308, 1852 (not of Pallas).

Solenostoma cyanopterus Bleeker, Nat. Tijds. Ned.-Ind., 6, p. 507, 1854.

Solenostomus cyanopterus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 26, fig. 13, 1922. Smith, Fishes of Southern Africa, p. 173, pl. 12, fig. 370, 1949. Padmanabhan, Bull. Central Res. Inst. Trivandrum, (C), 8, p. 1, pl. 1, figs. 1 and 2, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 54/93).

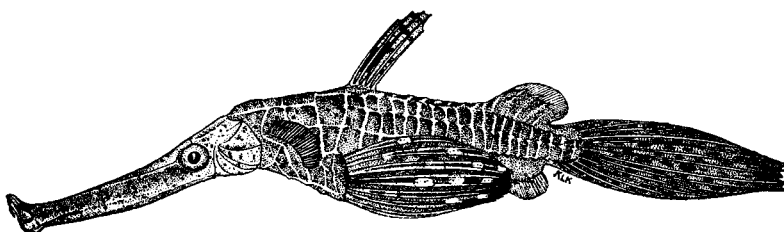


FIG. 136. *Solenostomus cyanopterus* Bleeker, 81 mm.

Specimen studied: Chetlat (1), 81 mm.

D₁. V; D₂. 19; A. 20; P. 26; V. i, 6.

Body highly compressed, head 2.3 in standard length, 3.1 in total length. Depth of body 5 in standard length, 7 in total length. Eye 10 in head, about 7 in snout and slightly more than interorbital space. A small barbel below the tip of the lower jaw. Length of ventrals equal to snout, their inner border fused with the ventrolateral sides of the body and outer border united at their base (female specimen). Longest ray of pectoral about an eye diameter. Caudal peduncle higher than long, membrane of caudal originating close to 2nd dorsal and anal. 3 rows of spinous projections on sides of body and a few near the bases of the dorsal and anal. Colour: Reddish brown with scattered black spots on head and body. First dorsal with long black streak each between 1st and 2nd and 2nd and 3rd spines and small black spots distally. Second dorsal, anal and pectoral whitish. Caudal brown with small black spots. Ventral brown.

Distribution: Red Sea, east coast of Africa, Laccadives, west coast of India, Indonesia, Thailand, China and Japan.

Family SYNGNATHIDAE

Body very elongate, generally with a produced tube-like snout and long tail. Mouth small, terminal. No teeth. Bony scutes forming rings around body and tail. One dorsal fin composed of soft rays, usually opposite to the minute

anal fin. Dorsal and anal sometimes wanting. Pectorals small or absent. Ventrals absent. Caudal fin present or absent. Only one branchiostegal. Four gills; pseudobranchiae well developed. Gill openings reduced, gill membranes attached to body and isthmus.

1. Caudal fin present 2
Caudal fin absent 7
2. Superior cristae of trunk and tail continuous 3
Superior cristae of trunk and tail discontinuous 5
3. Brood pouch subcaudal. An incomplete keel on operculum. Vent before middle of length. 28 or more tail rings. Median cristae of trunk extending to the third or fourth tail ring *Ichthyocampus belcheri*
Brood pouch abdominal. A complete longitudinal keel on operculum. Vent behind middle of length. Less than 25 tail rings 4
4. Intermedial shields of trunk and tail with a longitudinal keel. Rings 19+21-24 *Choeroichthys sculptus*
Intermedial shields of trunk and tail without longitudinal keel. Rings 14-15+18-20 *Choeroichthys brachysoma*
5. Trunk rings more numerous than tail rings. Most of the dorsal inserted on trunk. Caudal fin longer than half length of head. Anal origin twice nearer to caudal than to tip of snout *Doryrhamphus melanopleura*
Tail rings more numerous than trunk rings. Most of the dorsal inserted on tail. Caudal much shorter than half length of head 6
6. Upper profile of snout evenly continued to that of forehead. Eyes small. 13-14 trunk rings. Snout longer than postorbital part of head *Syngnathus cyanospilus*
Snout forming an angle with the dorsal side of eyes. Eyes large. 15-18 trunk rings. Snout about half length of head *Corythoichthys intestinalis intestinalis*
7. Body not compressed. Snout nearly twice length of postorbital part of head. No prenuchal shield *Syngnathoides biaculeatus*
Body compressed. Head almost at right angles with the trunk. Prenuchal shield with slightly raised coronet 8
8. Edges of body shields with blunt tubercles. Occipital ridge behind coronet rough but without distinct spines *Hippocampus kuda*
Edges of body shields with long spines. Occipital ridges behind coronet with two distinct spines *Hippocampus histrix*

137. *Ichthyocampus belcheri* Kaup

Ichthyocampus belcheri Kaup, Cat. Lophobranchiate Fishes, p. 30, 1856. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 1, fig. 1, 1967.

Ichthyocampus kampeni Weber, Siboga Exped., 57, Fische, p. 114, fig. 40, 1913 (in part). Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 93, fig. 38, 1922 (in part). Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 55/95).



FIG. 137. *Ichthyocampus belcheri* Kaup, 58 mm.
(after Jones and Kumaran)

Specimens studied: Kavarathi (6), 37 to 58 mm. Minicoy (3), 28 to 56 mm.

D. 21-22; A. 3; P. 12-13. Rings 16+28-30.

Head 7.5-8.4 in standard length. Snout as long as postorbital length of head. Head smooth, no distinct opercular ridge. Superior cristae of trunk and tail continuous. Median cristae of trunk extending to the third or fourth tail ring, median cristae of tail absent. Inferior cristae of trunk and tail continuous. Edges of posterior shields pointed. Caudal fin short. Dorsal insertion anterior to the small anal fin. Dorsal fin on the last one or two trunk rings and 4-5 tail rings. Brood pouch subcaudal. Colour: Brownish to dark brown with indefinite bars on sides. Caudal fin brownish.

Local names: *Fipumas* (Minicoy). *Pulchala* (Kavarathi).

Distribution: Laccadives and from Indonesia to the Philippines, China, Ryukyu Islands, Japan, New Caledonia, Solomon Islands and Fiji Islands.

138. *Choeroichthys sculptus* (Günther)

Doryichthys sculptus Günther, Cat. Fish. British Mus., 8, p. 185, 1870.

Choeroichthys sculptus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 61, fig. 26, 1922. Mukerji, Rec. Indian. Mus., 37, p. 276, 1935.

Specimens studied: Agathi (13), 53 to 63 mm. Bitra (3), 40 to 47 mm. Chetlat (12), 52 to 65 mm. Kavarathi (13), 33 to 67 mm. Minicoy (7), 52 to 59 mm.

D. 28-38; A. 3-4; P. 18-20. Rings 19+21-24.

Head 5.6-6.4 in standard length, 5.8-6.6 in total length. Depth of body less than half length of head. Dorsal profile of snout concave, its length equal to or slightly longer than postorbital part of head. Operculum with a median raised keel with radiating ridges. Keels on snout smooth. Superior cristae of trunk and tail continuous. Inferior cristae of trunk and tail discontinuous. Median cristae of trunk and tail continuous. Edges of shields granulated. Superior and

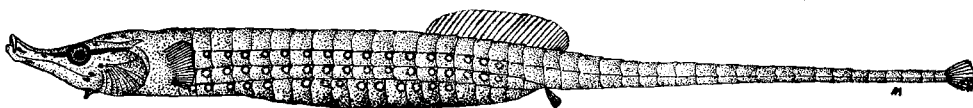


FIG. 138. *Choeroichthys sculptus* (Günther), 63 mm.

inferior intermediate shields of trunk and tail keeled. Origin of dorsal midway between tip of snout and caudal or nearer to the former. Anal fin behind middle of length and below posterior quarter of dorsal fin. Colour: Yellowish brown, a dark band from middle of snout through eye to opercle; three rows of dark edged bluish spots or dark spots on rings of trunk and often similar spots on lower part of head. Sometimes 5-6 white blotches on back, of which 3-4 before dorsal and two just below the base of dorsal fin. Dorsal and anal transparent; caudal brownish with white edges.

Distribution: East coast of Africa to the Laccadives, Andamans, Indonesia Philippines, Ryukyu Islands, Japan and eastwards to New Hebrides, Fiji Ellice and Society Islands.

139. *Choeroichthys brachysoma* (Bleeker)

Syngnathus brachysoma Bleeker, Nat. Tijds. Ned.-Ind., 8, p. 327, 1855.

Choeroichthys brachysoma Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 62, 1922.



FIG. 139. *Choeroichthys brachysoma* (Bleeker), 46 mm.

Specimens studied: Kavarathi (2), 40 and 46 mm.

D. 20-21; A. 4; P. 20-21. Rings 15+18-19.

Head 4.2-4.3 in standard length, 4.30-4.45 in total length. Depth of body 2.3 in length of head. Operculum with a rough longitudinal ridge with radiating lines below. Snout about 0.6 in head. Keels on snout smooth. Superior cristae of trunk and tail continuous. Shields striated, with minute serrated edges. Lateral intermediate shields without keels. Origin of dorsal nearer to eye than

to tip of caudal. Anal fin midway between operculum and caudal fin. Colour: Brown with two rows of black spots on trunk and a black band from snout through eye to opercle. Dorsal, anal and pectoral transparent; caudal slightly brownish basally, clear distally.

Distribution: Mauritius, Laccadives, Batu Islands (Indonesia), Bourbon, New Guinea and Cape York and Port Molle in Queensland.

140. *Doryrhamphus melanopleura* (Bleeker)

Syngnathus melanopleura Bleeker, Nat. Tijds. Ned.-Ind., 15, p. 464, 1858.

Doryrhamphus melanopleura Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 64, fig. 27, 1922. Mukerji, Rec. Indian Mus., 37, p. 275, fig. 2, 1935. Smith and Smith, Fishes of Seychelles, p. 11, pl. 96, I, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 55/96).

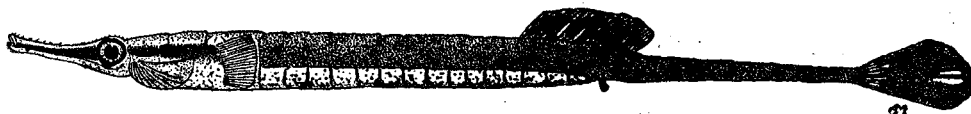


FIG. 140. *Doryrhamphus melanopleura* (Bleeker), 47 mm.

Specimens studied: Chetlat (2), 43 and 47 mm. Kadamat (1), 34 mm. Kavarathi (4), 37 to 48 mm. Minicoy (2), 44 and 47 mm.

D. 22-25; A. 4; P. 20-21. Rings 16-17 +14-15.

Head 4.4-4.7 in standard length, 4.9-5.4 in total length. Snout longer than postorbital length of head, with a raised serrated median ridge and one granulated ridge on each side of the median ridge. An oblique longitudinal keel on upper part of operculum with 7-8 radiating ridges below. Superior cristae of trunk and tail discontinuous. Median cristae of trunk and inferior cristae of tail continuous. Edges of shields with a posteriorly directed short spine. Origin of dorsal fin nearer to tip of caudal than to tip of snout. Anal origin twice nearer to caudal than to tip of snout. Caudal fin long, generally more than snout in length. Colour: Light tan with a wide bluish black band from tip of snout through eye to tail. Most of the caudal fin bluish black. Dorsal, anal and pectoral clear.

Distribution: Widespread in the Indo-Pacific from the east coast of South Africa to Mauritius, Seychelles, Laccadives, Andamans, Indonesia, Ryukyu Islands, Japan, eastwards to Samoa and Hawaiian Islands and Pacific Coast of North and South America.

141. *Syngnathus cyanospilus* Bleeker

Syngnathus cyanospilos Bleeker, Nat. Tijds. Ned.-Ind., 6, p. 114, 1854. Day, Fishes of India, p. 678, 1878.

Syngnathus cyanospilus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 83, 1922. Smith, Fishes of Southern Africa, p. 168, pl. 102, fig. 351, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 55/97).

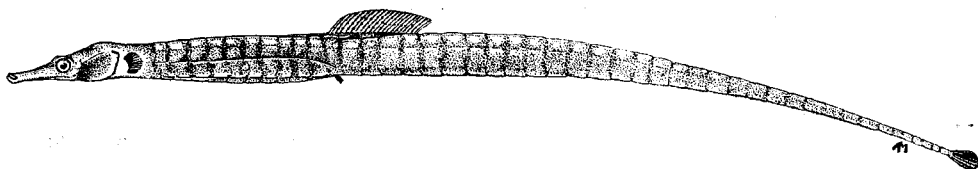


FIG. 141. *Syngnathus cyanospilus* Bleeker, 144 mm.

Specimens studied: Chetlat (4), 120 to 144 mm. Minicoy (1), 151 mm.

D. 22-25; A. 3; P. 14-16. Rings 13-14+33-37.

Head 8.0-9.2 in standard length, 8.25-9.50 in total length. Eye 6.8-7.6 in head and 3.0-3.4 in snout. Snout equal to or slightly longer than postorbital part of head. Dorsal situated on 5-6 rings commencing on the last trunk ring. Superior cristae of trunk reaching to nearly below middle of dorsal and separated from the superior cristae of tail. Median cristae of trunk deflected on last trunk ring and discontinuous with the inferior cristae of tail. Inferior cristae of trunk and tail continuous. Colour: Greyish brown, sides with irregular dark cross bars. Dorsal with 3 rows of blackish spots. Caudal slightly brownish.

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines and Taiwan.

142. *Corythoichthys intestinalis intestinalis* (Ramsay)

Syngnathus fasciatus Gray, Illustrations Indian Zoology, 1, pl. 89, figs. 2 and 2 A, 1832 (preoccupied by *Syngnathus fasciatus* Risso, 1810).

Syngnathus intestinalis Ramsay, Proc. Linn. Soc. New South Wales, 5, p. 494, 1881.

Corythoichthys fasciatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 70, 1922 (synonymy in part).

Corythoichthys intestinalis intestinalis Herald, Bull. U.S. Nat. Mus., 202, 1, p. 267, fig. 44, 1953. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 55/98).



FIG. 142. *Corythoichthys intestinalis intestinalis* (Ramsay), 106 mm.

Specimens studied: Agathi (5), 111 to 143 mm. Chetlat (5), 65 to 105 mm. Kadamat (3), 51 to 140 mm. Kalpeni (1), 119 mm. Kavarathi (8), 75 to 110 mm. Minicoy (19), 55 to 140 mm.

D. 27-31; A. 4; P. 15-18. Rings 16-18+34-38.

Head 7.8-9.3 in standard length, 8.1-9.6 in total length. Depth of body 2.5-2.9 in length of head. Eye 5.2-5.8 in head and 2.6-3.0 in snout. Dorsal profile of head abruptly rising to the prominent orbits. Occiput and nuchal shields with well defined median crests. Operculum with a longitudinal raised keel. Superior cristae of trunk and tail discontinuous, median cristae of trunk and superior cristae of tail incompletely interrupted, inferior cristae of trunk and tail continuous. Colour: Light yellowish grey; sides of body with 13-18 blackish bands composed of small anastomosing longitudinal lines sometimes spreading on to dorsal surface. Operculum with numerous dark longitudinal lines and another long one from snout below eye to lower border of operculum. Throat with black marmoration and the lower surface of first three trunk rings often with black cross bars. Fins whitish.

Local names: *Fipumas* (Minicoy). *Pulchala* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Ryukyu, Japan, Solomon Islands, New Hebrides and Australia.

143. *Syngnathoides biaculeatus* (Bloch)

Syngnathus biaculeatus Bloch, Naturges. Ausland. Fische, 1, p. 10, pl. 12, figs. 1 and 2, 1875.

Gastrotokeus biaculeatus Day, Fishes of India, p. 681, pl. 174, fig. 5, 1878.

Syngnathoides biaculeatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 40, figs. 18 and 19, 1922. Smith Fishes of Southern Africa, p. 169, fig. 357, 1949. Munro, Fishes of Ceylon, p. 84, pl. 14, fig. 230, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 55/99).



FIG. 143. *Syngnathoides biaculeatus* (Bloch), 214 mm.

Specimens studied: Agathi (1), 214 mm. Chetlat (2), 153 and 179 mm. Minicoy (1), 173 mm.

D. 39-46; A. 4-5; P. 20-23. Rings 15-17+42-48.

Head 5.7-6.2 in total length. Depth of body 4.8-6.1 in length of head. Maximum breadth of body 2.8-3.4 in head. Eye 8.2-10.4 in head, 4.8-5.7 in snout. A small supraorbital spine present. A blunt projection at occiput. A pair

of small branched barbels at chin. Dorsal situated on 8-10 rings commencing from the last trunk ring or first anal ring. Anal situated in a depression, behind opposite to origin of dorsal. Superior and inferior cristae of trunk and tail continuous. Median cristae of trunk rising posteriorly and reaching the superior cristae of tail behind dorsal. Colour: Pale brownish green above, somewhat yellowish on under surface. Head with a dark band from posterior half of snout through eye and opercle towards median cristae of trunk. Head and ventral sides of median cristae of trunk often with small dark brown spots. Dorsal, anal and pectoral white.

Local names: *Fipumas* (Minicoy). *Pulchala* (other islands).

Distribution: Widespread from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Ryukyu Islands, Samoa and south to Australia.

144. *Hippocampus kuda* Bleeker

Hippocampus kuda Bleeker, Nat. Tijds. Ned.-Ind., 3, p. 82, 1852. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 110, 1922. Smith, Fishes of Southern Africa, p. 167, fig. 347, 1949. Munro, Fishes of Ceylon, p. 84, pl. 14, fig. 231, 1955. Jones Bull. cent. mar. Fish. Res. Inst., 8, p. 7, 1969 (Cat. No. CMFRI-LA-F. 55/100).

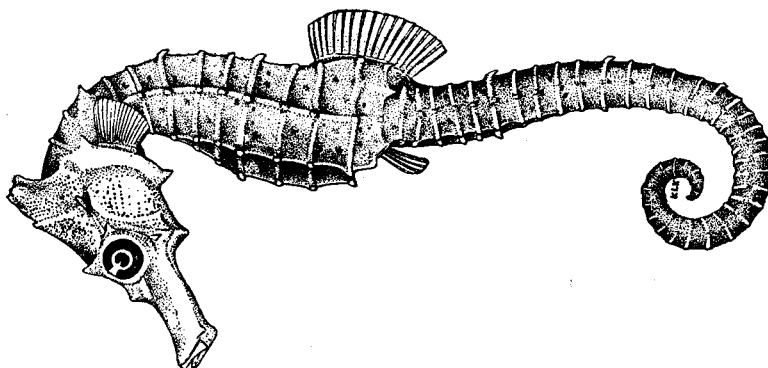


FIG. 144. *Hippocampus kuda* Bleeker, 65 mm.

Specimens studied: Kavarathi (1), 125 mm. Minicoy (2), 62 and 65 mm.

D. 17-18; A. 4; P. 16-17. Rings 11 + 36-37.

Head 1.2-1.5 in trunk. Trunk 1.6-1.8 in tail. Snout 2.1-2.5 in head, slightly longer than postorbital length of head. Eye 6-7 in head. Supraorbital tubercles well developed. Coronet low, directed obliquely backwards with 5 ill developed tubercles. Occipital keel behind coronet with two blunt projections. Tubercles on first, fourth, seventh and eleventh body rings and first, fifth, tenth,

fourteenth and eighteenth tail rings enlarged. Dorsal fin above last two body rings and first two tail rings. Colour: Dark brown with scattered darker spots. Fins hyaline.

Local names: *Godamas* (Minicoy). *Kuthirameen* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan and Hawaiian Islands.

145. *Hippocampus histrix* Kaup

Hippocampus histrix Kaup, Cat. Lophobranchiate Fishes, p. 17, 1856. Day, Fishes of India, p. 683, pl. 176, fig. 2, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 109, 1922. Smith, Fishes of Southern Africa, p. 167, 1949.

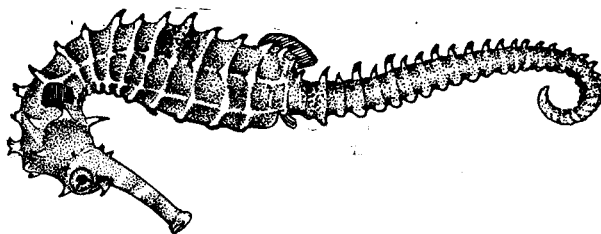


FIG. 145. *Hippocampus histrix* Kaup, 158 mm.

Specimens studied: Kadamat (1), 90 mm. Kavarathi (1), 158 mm.

D. 18; A. 4; P. 18. Rings 11+33-34.

Head 1.3 in trunk. Trunk 1.5 in tail. Snout slender and straight, about one eye diameter longer than postorbital part of head. Eye about 8 in head. Coronet with 5 spines. Supraorbital tubercle long and pointed. Two spines on occipital keel. Tubercles on cristae except those on posterior part of tail with long slender spines. Spines on first, fourth, sixth, seventh, tenth, twelfth and fourteenth tail rings more prominent than others. Dorsal fin on last two body rings and first tail ring. Colour: Brownish yellow. Snout with three light transverse bars and a dark line in front of eye. A few small dark brown spots on dorsal side in between sixth to eighth body ring and second to fourth tail ring. Spines on head, body and dorsal side of tail with black tips.

Local name: *Kuthirameen* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, Andamans, Indonesia and Japan.

Order CYPRINODONTIFORMES

Physoclistic. Maxillaries not entering gape of mouth. Head depressed. A single dorsal fin. Fins without spines. Ventral fins abdominal with 6-7 rays. Lateral line absent.

Family CYPRINODONTIDAE

Elongate, compressed body; head depressed. Minute conical teeth in jaws and sometimes on vomer. A single dorsal fin situated far back. Gill membranes exceptionally connected to each other and not united with isthmus. Four to six branchiostegals.

146. *Panchax panchax* (Hamilton Buchanan)

Esox panchax Hamilton Buchanan, Fishes of the Ganges, pp. 211 and 380, 1822.

Panchax panchax Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 374, figs. 96 and 97, 1922. Jones, Proc. Symposium on Scombroid Fishes, p. 649, fig. 6, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 56/101).

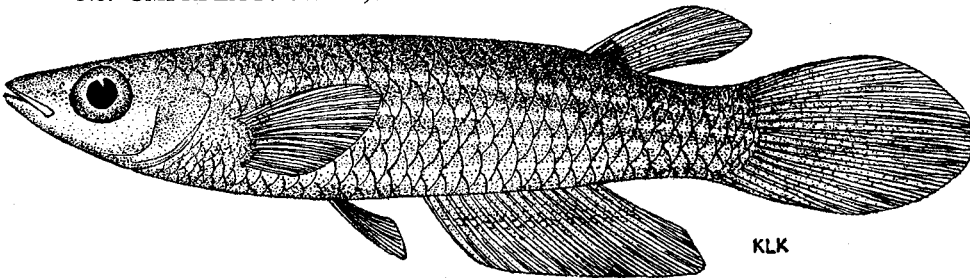


FIG. 146. *Panchax panchax* (Hamilton Buchanan), 35 mm.

Specimens studied: Kavarathi (3), 29 to 37 mm. Minicoy (21), 18 to 36 mm.

D. 7-8; A. 15-17; P. 13-14; V. 6. Llat. 29-30; Ltr. 9.

Body elongate and compressed, head depressed and flattened above. Head 3.3-3.5 in standard length, 4.1-4.5 in total length. Depth of body 4.7-5.4 in standard length, 5.8-6.8 in total length. Eye 3.3-3.5 in head, 1.1-1.2 in snout and 1.3-1.4 in interorbital space. Teeth in jaws small, in bands. Teeth present on vomer. Origin of dorsal above hind rays of anal. Pectoral slightly shorter than head. Colour: Greenish grey to light yellowish brown, lighter below. A golden spot above occiput. Dorsal, caudal and anal pale; dorsal with a black blotch at base of anterior four or five rays; pectoral and ventral hyaline.

Local name: *Inchamas* (Minicoy).

Distribution: A fresh and brackish water species from the Western parts of India to Ceylon, Malaysia and Indonesia. Introduced into the Laccadives from the mainland of India as a mosquito larvicide.

Order CYPRINODONTIFORMES

Physoclistic. Maxillaries not entering gape of mouth. Head depressed. A single dorsal fin. Fins without spines. Ventral fins abdominal with 6-7 rays. Lateral line absent.

Family CYPRINODONTIDAE

Elongate, compressed body; head depressed. Minute conical teeth in jaws and sometimes on vomer. A single dorsal fin situated far back. Gill membranes exceptionally connected to each other and not united with isthmus. Four to six branchiostegals.

146. *Panchax panchax* (Hamilton Buchanan)

Esox panchax Hamilton Buchanan, Fishes of the Ganges, pp. 211 and 380, 1822.

Panchax panchax Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 374, figs. 96 and 97, 1922. Jones, Proc. Symposium on Scombroid Fishes, p. 649, fig. 6, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 56/101).

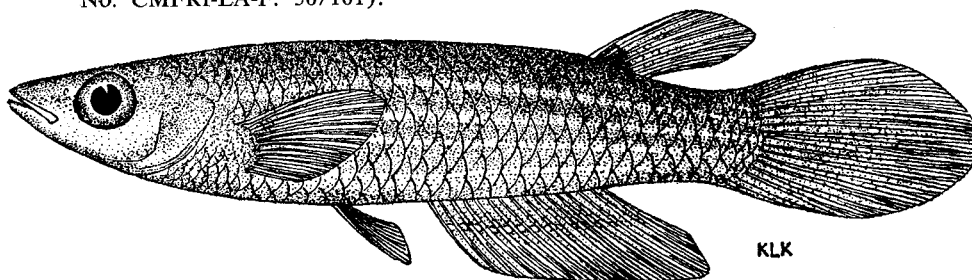


FIG. 146. *Panchax panchax* (Hamilton Buchanan), 35 mm.

Specimens studied: Kavarathi (3), 29 to 37 mm. Minicoy (21), 18 to 36 mm.

D. 7-8; A. 15-17; P. 13-14; V. 6. Llat. 29-30; Ltr. 9.

Body elongate and compressed, head depressed and flattened above. Head 3.3-3.5 in standard length, 4.1-4.5 in total length. Depth of body 4.7-5.4 in standard length, 5.8-6.8 in total length. Eye 3.3-3.5 in head, 1.1-1.2 in snout and 1.3-1.4 in interorbital space. Teeth in jaws small, in bands. Teeth present on vomer. Origin of dorsal above hind rays of anal. Pectoral slightly shorter than head. Colour: Greenish grey to light yellowish brown, lighter below. A golden spot above occiput. Dorsal, caudal and anal pale; dorsal with a black blotch at base of anterior four or five rays; pectoral and ventral hyaline.

Local name: *Inchamas* (Minicoy).

Distribution: A fresh and brackish water species from the Western parts of India to Ceylon, Malaysia and Indonesia. Introduced into the Laccadives from the mainland of India as a mosquito larvicide.

Order BERYCIFORMES

Body fairly deep with ctenoid scales or bony scutes, sometimes naked. Head with bony ridges and muciferous canals. Mouth usually protrusible. Orbitosphenoid present. Ventral fins thoracic or subabdominal, with or without a spine and with 3-13 rays.

Barbels on chin. 5 weak dorsal spinesPOLYMIXIIDAE
No barbels on chin. 11-12 strong dorsal spines.....HOLOCENTRIDAE

Family POLYMIXIIDAE

Body moderately oblong and compressed. Mouth large; maxillary dilated behind. Teeth in villiform bands in jaws and on vomer and palatines. A pair of long barbels beneath the chin. Dorsal and anal fins comparatively long with some graduated spines in front and many rays. Ventrals i, 6. Four branchiostegals. Large ctenoid scales with several ctenii.

147. *Polymixia japonica* Günther

Polymixia japonica Günther, Ann. Mag. Nat. Hist., (4), 20, p. 436, 1877. Lachner, Proc. U.S. Nat. Mus., 105, p. 201, 1955. Jones Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 189/102).
Polymixia nobilis Tholasilangam *et al.*, J. Mar. biol. ass. India, 6, p. 276, fig. 8, 1964 (not of Lowe).

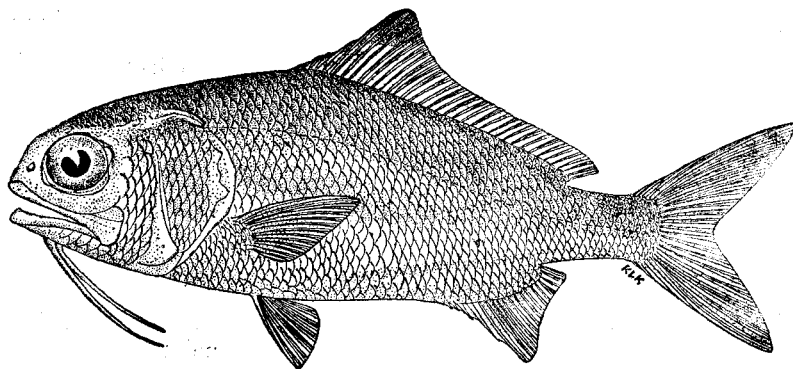


FIG. 147. *Polymixia japonica* Günther, 175 mm.

Specimen studied: Agathi (1), 175 mm.

D. V, 33; A. IV, 14; P. i, 14; V. i, 6. Ll. 35; Ltr. 8+1+16. GR. 14.

Moderately oblong, compressed. Head 2.7, depth of body about 2.8 both in standard length. Eye 3.6 in head, about 0.6 in snout and 0.7 in inter-orbital space. Maxillary extending behind vertical from the hind border of eye. Length of chin barbels slightly more than postorbital length of head plus half eye diameter. Dorsal and anal fins comparatively long. Length of pectoral more than postorbital part of head. Ventral 1.3 times eye diameter. Teeth in villiform bands in jaws and on vomer and palatines. Colour: Brownish, becoming lighter below; operculum darker. Dorsal brownish, anterior six soft rays blackish distally. Anal brownish, edges of rays lighter. Caudal brownish. Pectoral light brownish. Ventral pale, first four rays slightly brownish submarginally.

Distribution: Off Natal, off west coast of India, Laccadives, Philippines, Japan and Hawaiian Islands.

Note: In addition to the specimen from Agathi Island four of the specimens reported by Tholasilingam *et al* (1964) were examined by us and on the basis of important meristic characters we find that these are of *P. japonica*.

Family HOLOCENTRIDAE

Oblong or ovate and moderately compressed. Eyes large. Teeth small, in bands in jaws, vomer and palatines. Bones of head serrated. Preoperculum sometimes with a long spine at angle. Dorsal fin with ten or eleven spines and anal with four spines. Scales large and strongly ctenoid. 26 or 27 vertebrae.

1. Angle of preopercle with a long spine 2
 Angle of preopercle without long spine 8
2. Eleventh dorsal spine slightly longer than tenth and close to first soft dorsal ray 3
 Eleventh dorsal spine shorter than tenth and separated from the first soft dorsal ray by a deep incision 4
3. Pectoral rays generally ii, 12. A large black blotch between first to fourth dorsal spines. Anterior edges of soft dorsal and anal blackish *Holocentrus sammara*
 Pectoral rays ii, 11. Dorsal fin plain without black blotch anteriorly. Anterior edges of soft dorsal and anal plain or only faintly dusky *Holocentrus laevis*
4. Four rows of scales between lateral line and spinous dorsal. D. XI, 15; A. IV, 10 *Holocentrus spinifer*
 Three rows of scales between lateral line and spinous dorsal. D. XI, 13-14; A. IV, 8-9 5
5. Ll. 46-48. Spinous dorsal blackish with a median curved white band. Membrane between third and fourth spines of anal usually blackish *Holocentrus diadema*
 Ll. less than 46. Colour not as above 6

6. Nasalia without spines in front. Nasal opening without spines. Preoperculum with eight rows of scales *Holocentrus lacteoguttatus*
 Nasalia ending in a bifid spine in front. Nasal opening with spines 7
7. Ll. 35-36. Spinous dorsal membrane scarcely incised. A black blotch on upper end of operculum *Holocentrus violaceus*
 Ll. 40-41. Spinous dorsal membrane incised. No black blotch on upper end of operculum *Holocentrus caudimaculatus*
8. 27-29 gill rakers on lower limb of first gill arch. Anterior rays of dorsal and anal dusky distally *Myripristis murdjan*
 24-25 gill rakers on lower limb of first gill arch. Distal third of spinous dorsal blackish. Tips of anterior rays of dorsal and anal deep black. Lobes of caudal blackish distally *Myripristis adustus*

148. *Holocentrus sammara* (Forskål)

Sciaena sammara Forskål, Descript. Animal., p. 48, 1775.

Holocentrum sammara Day, Fishes of India, p. 173, 1878 (in part). Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, 233, 1929 (in part).

Holocentrus sammara Smith, Fishes of Southern Africa, p. 153, pl. 9, fig. 294, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 59/103).

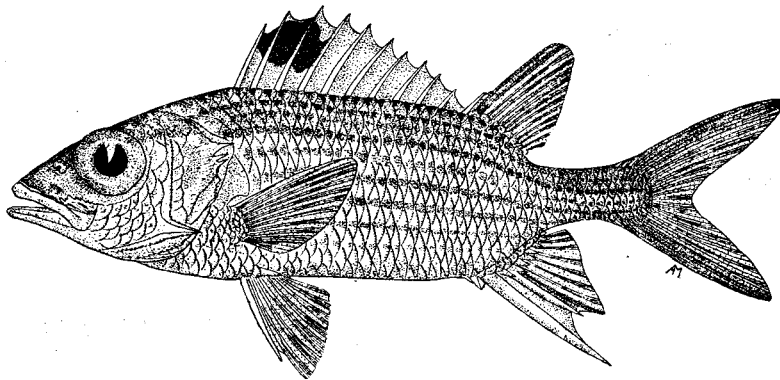


FIG. 148. *Holocentrus sammara* (Forskål), 140 mm.

Specimens studied: Ameni (1), 120 mm. Bitra (1), 58 mm. Chetlat (1), 86 mm. Kadamat (9), 36 to 130 mm. Kavarathi (10), 34 to 67 mm. Kiltan (7), 48 to 99 mm. Minicoy (10), 35 to 164 mm.

D.XI, 12-13; A. IV, 8; P. ii, (11) 12; V. I, 7. Ll. 39-42; Ltr. 3+1+7.

Head 2.6-2.8 in standard length, 3.3-3.6 in total length. Depth of body 3.1-3.5 in standard length, 4.0-4.4 in total length. Eye 2.7-3.0 in head, 0.8-1.0 in snout and about 0.7 in interorbital space. Nasalia obtusely rounded in front.

Preorbital with a row of spines, the front one large, suborbital and postorbital serrated. Two flat spines on upper part of operculum. Opercular spine extending upto the margin of opercular membrane. All opercular bones strongly serrated, preopercular spine reaching almost to the branchial opening. Last dorsal spine close to the first dorsal ray, longer than the preceding one. Third anal spine longer than snout and eye together. Pectoral and ventral subequal, as long as or slightly longer than snout and eye together. Colour: Yellowish to silvery white with brown bands along scale rows formed by spots in the centre of scales, the one along lateral line darker than others. Upper parts of head greyish, cheeks with 5 or 6 rows of black spots. Spinous dorsal pale to dusky, with a large black blotch between first four spines. Soft dorsal and soft anal pale, anterior rays of these fins often blackish. Caudal lobes pale yellowish with submarginal longitudinal dark streak along lobes.

Local names: *Hudubarihi* (Minicoy). *Kolkaduva* (other islands).

Distribution: East coast of Africa and the Red Sea to the Laccadives, coasts of India, Indonesia, Philippines, Marshall, Marianas, Hawaii and Marquesas Islands.

149. *Holocentrus laevis* Günther

Holocentrum laeve Günther, Cat. Fish. British Mus., 1, p. 49, 1859.

Holocentrus laeve Smith and Smith, Fishes of Seychelles, p. 9, pl. 6, B, 1963.

Holocentrus laevis Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 59/104).

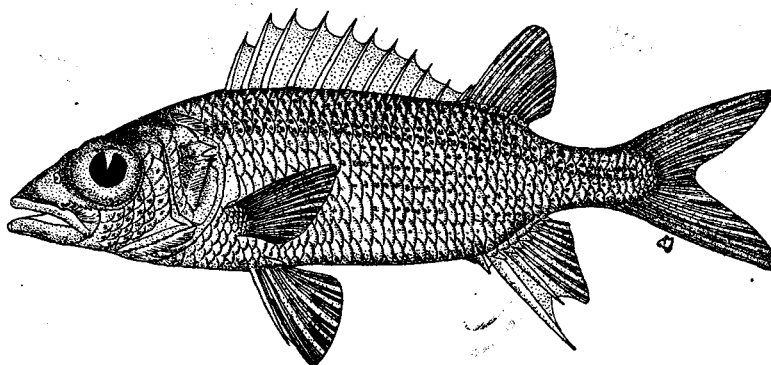


FIG. 149. *Holocentrus laevis* Günther, 125 mm.

Specimens studied: Agathi (2), 102 and 112 mm. Chetlat (1), 142 mm. Kadamat (1), 80 mm. Kavarathi (4), 32 to 88 mm. Mincoy (5), 93 to 135 mm. D. X, I, 12; A. IV, 8; P. ii, 11; V. I, 7. L1. 39-42; Ltr. 3+1+7-8.

Head 2.7-3.0 in standard length, 3.3-3.6 in total length. Depth of body 3.1-3.5 in standard length, 3.8-4.5 in total length; Eye 2.8-3.2 in head, about

0.8 in snout and 0.6-0.7 in interorbital space. Preorbital with a row of spines, the anteriormost largest; suborbital and postorbital strongly serrated. The flat preopercular spine reaching to margin of opercular flap or slightly beyond. Opercular bones strongly serrated, preopercular spine broad and not reaching to branchial opening. Third anal spine larger and stronger than fourth, equal to snout and eye together. Colour: Silvery white with brownish snout and interorbital space and 9-10 longitudinal rows of brown spots on body. Cheeks with 5-6 rows of brown spots. Anterior rays of dorsal and anal pale to white, sometimes faintly dusky. Outer rays of caudal dusky.

Local names: *Digubarihi* (Minicoy). *Kolkaduva* (other islands).

Distribution: East coast of Africa to the Laccadives, Indonesia, eastwards to Marianas and Solomon Islands.

150. *Holocentrus spinifer* (Forskål)

Sciaena spinifera Forskål, Descript, Animal., p. 49, 1775.

Holocentrum spiniferum Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 235, 1929.

Holocentrus spinifer Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 59/105).

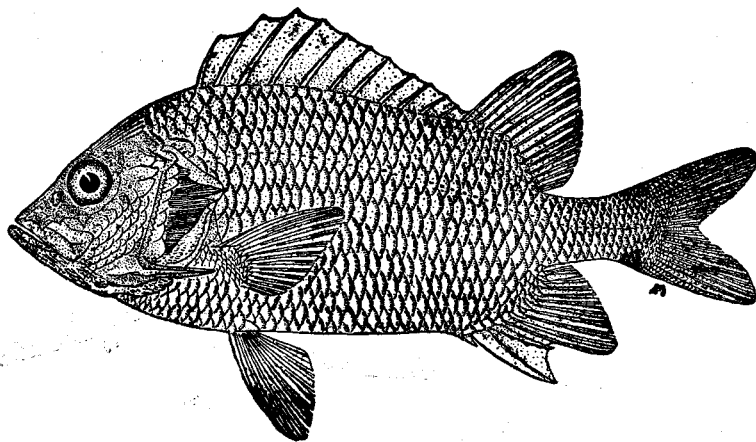


FIG. 150. *Holocentrus spinifer* (Forskål), 280 mm.

Specimens studied: Agathi (3), 170 to 190 mm. Chetlat (1), 76 mm. Minicoy (4), 155 to 280 mm.

D. XI, 15; A. IV, 10; P. ii, 13; V. I, 7. L1. 42-44; Ltr. $4+1+8\frac{1}{2}$.

Head 2.6-2.8 in standard length, 3.3-3.5 in total length. Depth of body 2.4-2.6 in standard length, 3.0-3.3 in total length. Eye 3.9-4.6 in head, 1.0-1.3

in snout and about 0.6 in interorbital space. Maxillary reaching almost to below middle of eye. Nasalia in front ending in a bifurcate spine. Preorbital with two large spines and some smaller spines. Postorbital serrated. Preopercular spine reaching behind gill opening, as long as snout. Opercular bones serrated; upper opercular spine slightly longer than lower. Third dorsal spine longest, about twice eye diameter; posterior spine gradually decreasing in length to the last measuring half eye diameter. First anal spine minute; third longest, equal to third spine of dorsal. Ventral as long as pectoral. Colour: Uniform reddish, back darker; cheek, breast and lower sides yellowish red. Spinous dorsal reddish; other fins reddish yellow. A dusky spot present basally between first and third spines in the smallest specimen.

Local names: *Raverimas* (Minicoy). *Theekaduva*, *Kallalam* (other islands).

Distribution: Red Sea, Madagascar, Laccadives, Indonesia, Philippines, Hawaiian Islands, Solomon and Tuamotu Islands.

151. *Holocentrus diadema* Lacépède

Holocentrus diadema Lacépède, Hist. Nat. Poissons, 5, pp. 372 and 374, pl. 32, fig. 3, 1803. Smith, Fishes of Southern Africa, p. 153, pl. 9, fig. 296, 1949. Munro, Fishes of Ceylon, p. 87, pl. 15, fig. 238, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 59/106).

Holocentrum diadema Day, Fishes of India, p. 171, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 238, 1929.

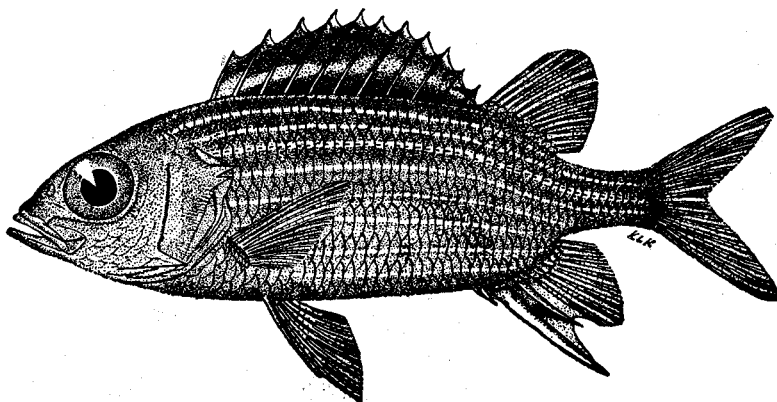


FIG. 151. *Holocentrus diadema* Lacépède, 128 mm.

Specimens studied: Agathi (1), 77 mm. Androth (1), 86 mm. Kiltan (2), 72 and 91 mm. Minicoy (7), 50 to 199 mm. Suheli (1), 85 mm.

D. XI, 13 (14); A. IV, 8-9; P. ii, 12; V. I, 7. L1. 46-48; Ltr. 3+1+7.

Head 2.8-3.2 in standard length, 3.5-4.0 in total length. Depth of body 2.9-3.1 in standard length, 3.5-3.7 in total length. Eye about 2.7-2.9 in head, 0.6-0.7 in snout and about 0.7 in interorbital space. Teeth small in bands in jaws, vomer and palatines. Preorbital and suborbital strongly serrated, a spine anteriorly on preorbital. Preopercular spine slightly shorter than snout and extending beyond opercular flap. Opercular bones strongly serrated. Upper opercular spine longer than the lower. Third anal spine stronger and longer than fourth, as long as head without snout. Pectoral shorter than head without snout. Ventral longer than pectoral, equal to or shorter than head without snout. Colour: Reddish brown with pale yellow longitudinal bands bordered by brown pigments along scale rows. Axil of pectoral often brownish. Spinous dorsal blackish with a median curved white band sometimes broken about the middle of the fin and often the upper margin of the membrane pale white. Anal pale yellowish, membrane between third and fourth anal spine blackish or dusky. Other fins pale yellow.

Local names: *Rybarihi* (Minicoy). *Kaduva* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives to the coasts of India, Ceylon, Indonesia, Philippines, China and Marianas, Marshall and Marquesas Islands.

152. *Holocentrus lacteoguttatus* Cuvier

Holocentrum lacteoguttatum Cuvier and Valenciennes, Hist. Nat. Poissons, 9, p. 214, 1829.

Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 240, 1929.

Holocentrus lacteo-guttatus Smith, Fishes of Southern Africa, p. 153, pl. 9, fig. 297, 1949.

Munro, Fishes of Ceylon, p. 87, pl. 15, fig. 240, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 59/107).

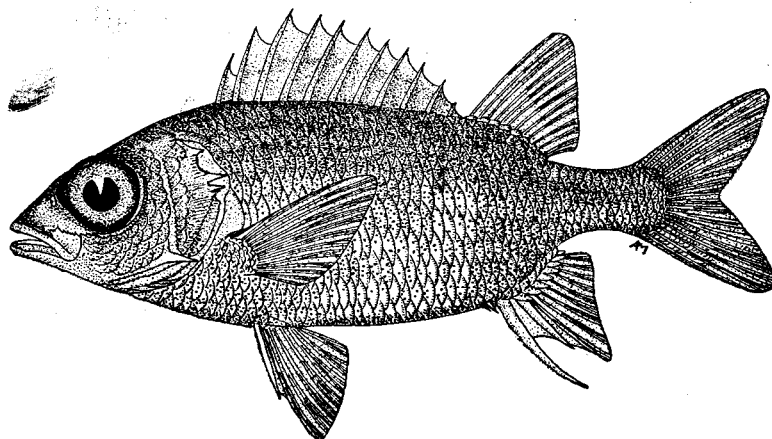


FIG. 152. a. *Holocentrus lacteoguttatus* Cuvier, 82 mm.

Specimens studied: Androth (13), 47 to 96 mm. Bitra (14), 54 to 86 mm. Chetlat (12), 47 to 96 mm. Kalpeni (7), 58 to 75 mm. Kavarathi (12), 66 to 96 mm. Minicoy (18), 51 to 86 mm. Suheli (9), 42 to 84 mm.

D. XI, 13; A. IV, 9; P. ii, 13; V. I, 7. L1. 43-45; Ltr. 3+1+8.

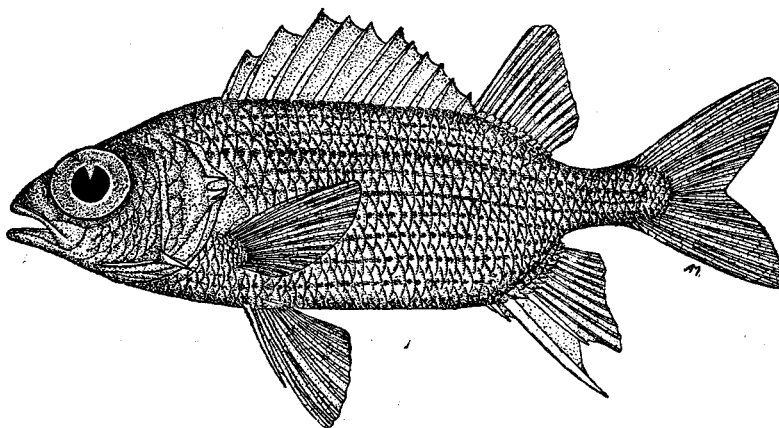


FIG. 152 b. *Holocentrus lacteoguttatus* Cuvier, 83 mm.

Head 2.8-3.0 in standard length, 3.4-3.6 in total length. Depth of body 2.8-3.1 in standard length, 3.4-3.7 in total length. Eye 2.7-2.8 in head, 0.6 in snout and 0.7 in interorbital space. Nasalia without spines in front. Preorbital with a strong backwardly directed spine in front and smaller spines posteriorly. Opercular bones strongly serrated. Preopercular spine reaching to branchial opening. Pectoral equal to or slightly longer than ventral but shorter than head without snout. Colour: Pale brownish with reddish tinge above becoming lighter below, with small scattered dark spots on head and body. Basal two third of spinous dorsal reddish, outer portion pale; other fins pale. In another colour variety the general ground colour pale brownish with reddish tinge above becoming lighter below, but the dark spots on head and body less numerous than in the other variety and the sides of body with pale yellowish longitudinal bands along scale rows.

Local names: *Barihi* (Minicoy). *Kaduva* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, Ceylon, Indonesia, Philippines and Marianas, Marshall, Tahiti and Hawaiian Islands.

153. *Holocentrus violaceus* Bleeker

Holocentrum violaceum Bleeker, Nat. Tijds. Ned.-Ind., 5, p. 335, 1853. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 246, 1929.

Holocentrus violaceus Smith and Smith, Fishes of Seychelles, p. 9, pl. 87, F, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 286, fig. 1, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 59/108).

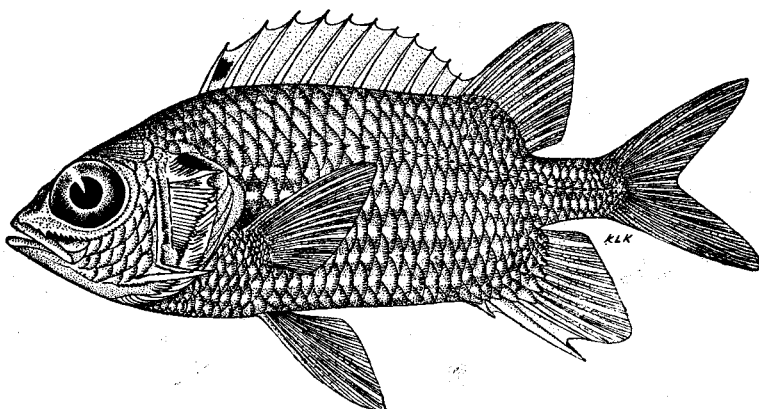


FIG. 153. *Holocentrus violaceus* Bleeker, 99 mm. (after Jones and Kumaran)

Specimens studied: Chetlat (1), 172 mm. Kalpeni (1), 99 mm.

D. XI, 14; A. IV, 9; P. ii, 12; V. I, 7. L1. 35-36; Ltr. 3+1+8.

Head 2.7-2.8 in standard length, 3.3-3.4 in total length. Depth of body 2.6-2.7 in standard length, 3.2-3.3 in total length. Eye 3.2-3.5 in head, 0.7-0.8 in snout and 0.6 in interorbital space. Nasalia ending in a bifurcate spine in front. 3-4 spines at upper and hind edge of nasal opening. Preorbital with a large downwardly directed spine in front and some backwardly directed spines posterior to it. Maxillary nearly reaching to below middle of eye. Two flat spines on superior part of operculum. Preopercular spine long, equal to eye or slightly longer. Opercular bones strongly serrated. Ventral slightly longer than pectoral but shorter than head without snout. Third or fourth dorsal spine longest, 1.2-1.3 times eye diameter. Third anal spine longer and stronger than fourth, 1.6-1.8 eye diameter. Colour: Purplish brown above, lighter below, with yellowish to pale longitudinal bands along scale rows. A black blotch on upper part of operculum. Spinous dorsal light brownish, the membrane between first two spines slightly darker. Soft dorsal, caudal and anal pale yellowish.

Local name: *Kaduva* (other islands).

Distribution: Seychelles, Laccadives, Indonesia to the Philippines, New Guinea, North Australia, Fiji, Samoa and Tahiti.

154. *Holocentrus caudimaculatus* Rüppell

Holocentrus spinifer Rüppell, Atlas Reise Nördl. Africa, Fische Rothen Meeres, p. 86, pl. 23, fig. 1, 1828 (not of Forskal).

Holocentrum caudimaculatum Rüppell, Neue Wirbelt., Fische Rothen Meeres, p. 97, 1835. Day, Fishes of India, p. 172, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 247, 1929.

Holocentrus caudimaculatus Munro, Fishes of Ceylon, p. 88, pl. 15, fig. 242, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 59/109).

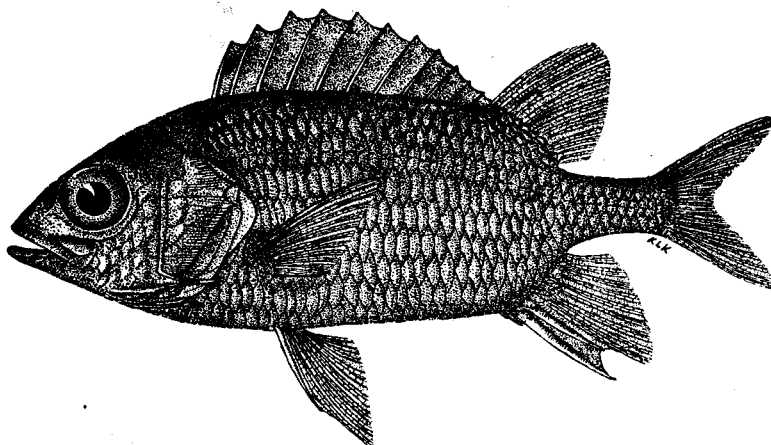


FIG. 154. *Holocentrus caudimaculatus* Rüppell, 146 mm.

Specimens studied: Agathi (1), 85 mm. Chetlat (2), 145 and 168 mm. Minicoy (3), 142 to 146 mm.

D. XI, 14; A. IV, 9; P. ii, 12; V. I, 7. L1. 40-41; Ltr. 3+1+7.

Head 2.6-2.8 in standard length, 3.3-3.5 in total length. Depth of body 2.4-2.7 in standard length, 3.1-3.3 in total length. Eye 3.0-3.2 in head, 0.8-0.9 in snout and 0.6-0.7 in interorbital space. Maxillary reaching almost to below middle of eye. Nasalia ending in a bifurcate spine in front. Preopercular spine reaching beyond gill opening. Front border of nasal opening with one spine. Preorbital with a blunt spine in front followed by smaller ones. Suborbital and postorbital strongly serrated. Ventrals equal to or slightly shorter than pectorals. Two flat spines on superior part of operculum. Third or fourth dorsal spine longest, 1.3-1.5 of eye diameter. Third anal spine long, twice eye diameter. Colour: Reddish, chest, abdomen and upper part of caudal peduncle lighter. Fins yellowish, spinous dorsal with reddish tinge.

Local names: *Raverimas* (Minicoy). *Theekaduva* (other islands).

Distribution: Red sea and Madagascar to the Laccadives, coast of India, Ceylon, Indonesia, Philippines, Caroline Islands, Gilbert Islands and Tahiti.

155. *Myripristis murdjan* (Forskål)

Sciaena murdjan Forskål, Descript. Animal., p. 48, 1775.

Myripristis murdjan Day, Fishes of India, p. 170, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 259, 1929 (in part). Smith, Fishes of Southern Africa, p. 154, pl. 9, fig. 298, 1949. Munro, Fishes of Ceylon, p. 88, pl. 15, fig. 244, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 59/110).

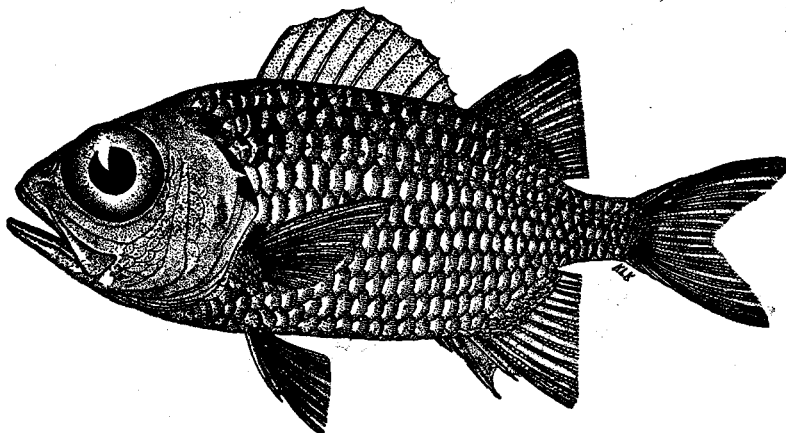


FIG. 155. *Myripristis murdjan* (Forskål), 100 mm.

Specimens studied: Agathi (4), 45 to 75 mm. Ameni (4), 54 to 108 mm. Androth (1), 64 mm. Chetlat (3), 42 to 110 mm. Kadamat (13), 40 to 80 mm. Kavarathi (4), 59 to 133 mm. Kiltan (12), 54 to 64 mm. Minicoy (11), 42 to 158 mm.

D. X, I, 15 (16); A. IV, 13 (14); P. ii, 12-13; V. I, 7. L1. 28-30; Ltr. 3+1+7.

Head 2.5-2.9 in standard length, 3.4-4.0 in total length. Depth of body 2.3-2.5 in standard length, 2.8-3.3 in total length. Eye 2.3-2.5 in head, about 0.4 in snout and about 0.6 in interorbital space. Maxillary reaching to below hind border of pupil. Orbitals and opercular bones serrated. Pectoral shorter than head without snout. Two rows of teeth in upper jaw, outer enlarged, teeth in two rows anteriorly in lower jaw and in a single row behind. Ventral shorter than pectoral. Third anal spine stronger and equal to or slightly longer than fourth spine. Colour: Reddish brown, scales above lateral line often with light centres. Spinous dorsal pale. Posterior border of operculum above the level of pectoral blackish. Axil of pectoral black. Soft dorsal and anal pale, anterior rays dusky to blackish. Submarginal rays of caudal lobes dusky, rest of the fin pale.

Local names: *Lobodubarihi* (Minicoy). *Perumkanni*, *Kannankaduva* (other islands).

Distribution: Tropical Indo-Pacific from the east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Japan, Hawaiian and Tuamotu Islands.

156. *Myripristis adustus* Bleeker

Myripristis adustus Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 108, 1853. Smith, Fishes of Southern Africa, p. 504, pl. 35, fig. 298 a, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 59/111).

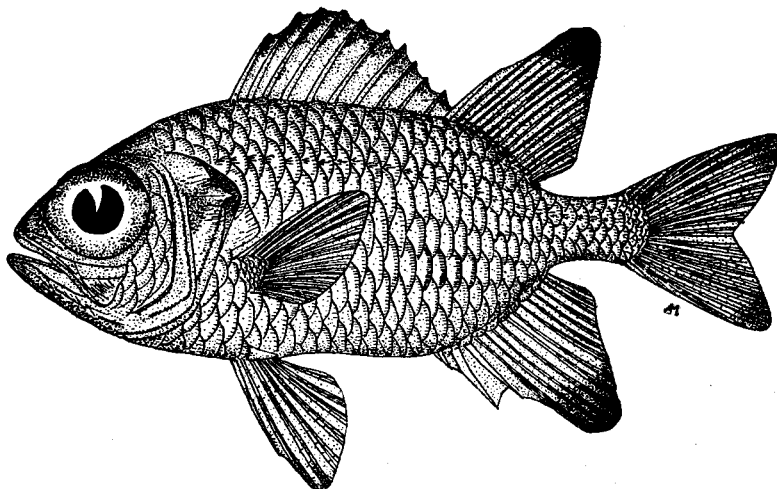


FIG. 156. *Myripristis adustus* Bleeker, 85 mm.

Specimens studied: Kavarathi (1), 85 mm. Minicoy (1), 41 mm.

D. X, I, 15; A. IV, 13; P. ii, 14; V. I, 7. L1. 28; Ltr. 3+1+6.

Head 2.7 in standard length, 3.5 in total length. Depth of body 2.3 in standard length, 2.9 in total length. Eye 2.3 in head, about 0.4 in snout and 0.6 in interorbital space. Maxillary reaching past hind border of pupil. Teeth in jaws, biserial. Orbitals and opercular bones serrated. Pectoral equal to ventral, shorter than head without snout. Third anal spine stronger, but slightly shorter than fourth spine. Colour: Reddish brown, lighter below. Upper part of head brownish. Scales above lateral line with brownish margin. Opercular margin above and below the opercular spine dark brown. Pectoral axil dark brown. Spinous dorsal dusky with the distal parts black. Soft dorsal and anal dusky anteriorly, lighter posteriorly but the tips of anterior rays black. Caudal dusky, distal portion of the lobes blackish. Ventral pale, tip dusky.

Local names: *Lofodubarihi* (Minicoy). *Perumkanni*, *Kannankaduva* (other islands).

Distribution: East coast of Africa, Laccadives, Indonesia and Marshall and Marianas Islands.

Order ZEIFORMES

Body deep and compressed, generally with ctenoid scales. Post-temporal adnate to the abdomen. Anal fin short with 1-4 spines. Ventrals often with one spine and 5-9 rays.

Family ZEIDAE

Deep bodied and compressed. Mouth large, highly protractile. Teeth usually feeble, in a single series or in several series. Dorsal fin single consisting of a spinous part and a soft part, sometimes the two portions quite distinct. Sometimes series of bony serrated plates or spines present on the ventral side of chest and abdomen. Base of soft dorsal and anal sometimes with similar spines. Ventral thoracic with one spine and 6-8 rays or sometimes consisting of rays only. Scales small or sometimes absent.

157. *Zen scutatus* (Gilchrist and von Bonde)

Paracyttopsis scutatus Gilchrist and von Bonde, Rep. Fish. Mar. Bio. Surv. 3, Spec. Rep., 7, p. 18, pl. 5, 1924. Barnard, Ann. S. Afr. Mus., 21, p. 378, 1929.

Zen scutatus Norman, John Murray Exp., 7, p. 57, 1939. Smith, Fishes of Southern Africa, p. 145, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 190/92).

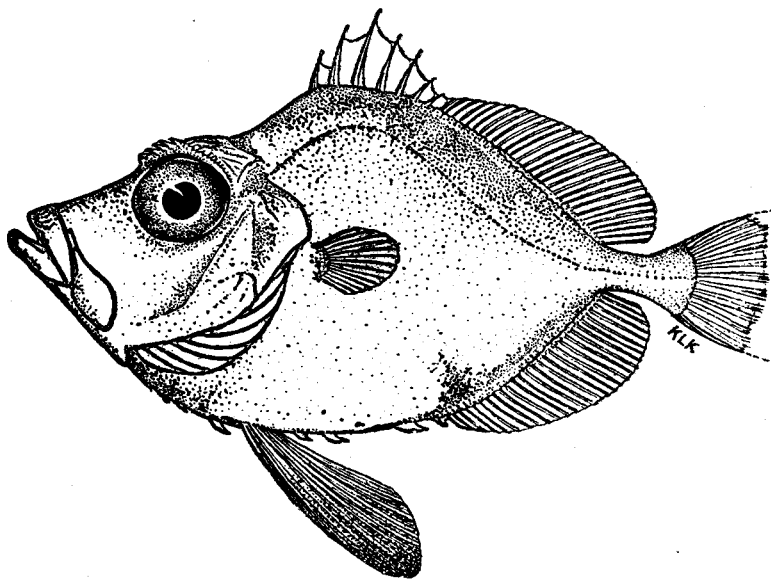


FIG. 157. *Zen scutatus* (Gilchrist and von Bonde), 108 mm.

Specimen studied: Near Kalpeni (1), 108 mm.

D. VII, 29; A. II, 29; P. 14; V. 9. LI. 85. GR. 2+1+8.

Body deep and compressed with small cycloid scales. Head 2.4 in standard length. Depth of body 1.8 in standard length. Eye 2.8 in head, shorter than snout and 0.6 in slightly concave interorbital space. Mouth terminal and protractile. Teeth minute, in narrow bands in jaws and on vomer. A supraorbital ridge of spines. Ventral edge of chest and belly with seven spines. Bases of dorsal and anal with bony plates. Ventral fin large, without spine, about $\frac{1}{2}$ snout shorter than head and reaching beyond origin of anal. Pectoral slightly shorter than eye diameter. First spine of dorsal about $\frac{1}{2}$ of eye diameter; third spine longest, almost equal to eye diameter; last spine about half length of first spine. First anal spine strong, second very small. Colour: Uniform greyish. Fins hyaline except ventral which is blackish distally.

Distribution: So far recorded only from off the coasts of Natal, Maldives and Kalpeni in the Laccadives.

Order MUGILIFORMES

Body moderately elongate with cycloid or ctenoid scales. Two dorsal fins. Ventrals abdominal or subabdominal. Pelvic bones connected with cleithra or post-cleithra by a ligament.

1. Lateral line well developed; mouth wide, teeth large and fang-like
..... SPHYRAENIDAE
Lateral line absent or represented by pores; mouth small or moderate; teeth small or absent 2
2. First dorsal fin with 4 stiff spines. Anal fin with 3 weak spines
..... MUGILIDAE
First dorsal fin with 4-8 weak spines. Anal fin with one weak spine
..... ATHERINIDAE

Family SPHYRAENIDAE

Body elongate and subcylindrical. Snout prolonged. Mouth large, lower jaw projecting beyond the upper. Maxillary with a supplemental bone. Large unequal teeth in jaws, some fang-like; teeth present on palatines. First dorsal with five strong spines. Second dorsal widely separated from the first and opposite to anal. Gill membranes free and not united with isthmus. Seven branchiostegals. Scales small, cycloid. Lateral line complete.

1. An elongate gill raker at angle of first gill arch. Maxilla ending well before eye 2
No elongate gill raker at angle of first gill arch. Maxilla ending close to or below front of eye. Angle of preopercle obtusely rounded 4
2. No skinny flap at angle of preopercle. First dorsal origin far behind tip of pectoral. Lateral line scales 130 *Sphyraena novaehollandiae*
A skinny flap at angle of preopercle. Tip of pectoral within 2/3 eye diameter from level of origin of dorsal. Lateral line scales less than 90 3
3. First dorsal spine much shorter than postorbital part of head and not higher than soft dorsal. Dorsal origin above or slightly behind tip of pectoral. Distance from tip of depressed first dorsal to origin of second dorsal as long as snout. Depth 7.1-8.0 *Sphyraena chinensis*
Second dorsal spine equal to or slightly longer than postorbital part of head and higher than soft dorsal. Dorsal origin anterior to a vertical from tip of pectoral. Distance from tip of depressed first dorsal to insertion of second dorsal less than length of maxillary. Depth 6.2-6.8
..... *Sphyraena chrysotaenia*
4. Less than 20 scales from origin of lateral line to vertical through insertion of first dorsal. L1. 79-83. Depth 6.4-6.9 *Sphyraena barracuda*
More than 20 scales from origin of lateral line to vertical through insertion of first dorsal. L1. 117-122. Depth 7.7-8.1 *Sphyraena forsteri*

158. *Sphyraena novaehollandiae* Günther

Sphyraena novae-hollandiae Günther, Cat. Fish. Brit. Mus., 2, p. 335, 1860.

Australuzza novaehollandiae Smith, Ichth. Bull., 3, p. 40, fig. 1, 1956.

?*Sphyraena helleri* Jenkins, Bull. U.S. Bur. Fish., 19, p. 387, fig. 1, 1901. Schultz, Bull. U.S. Nat. Mus., 202, 1, p. 287, 1953.

Sphyraena novaehollandiae Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 165, fig. 3, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 8, 1969 (Cat. No. CMFRI-LA-F. 61/113).

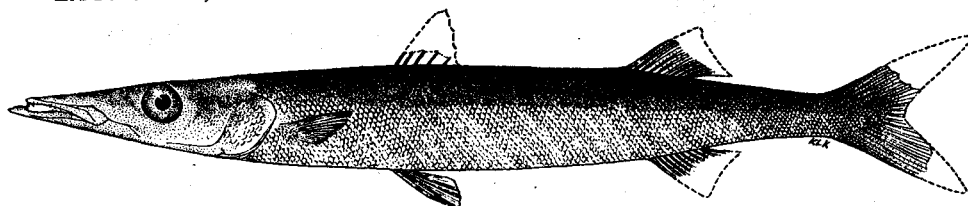


FIG. 158. *Sphyraena novaehollandiae* Günther, 425 mm.
(after Jones and Kumaran)

Specimens studied: Bangaram (1), 143 mm. Minicoy (1), 425 mm.

D₁. V; D₂. I, 9; A. II, 8; P. ii, 11; V. I, 5. Ll. 130; Ltr. 14+1+21.

Head 3.1-3.2 in standard length. Depth of body 7.7-8.0 in standard length. Eye 5.6-6.2 in head, 2.6-2.8 in snout and 1.1 in almost flat interorbital space. Maxillaries reaching 3/4 eye diameter before eye, 2.8-2.9 in head. Lower jaw projecting with an elongate fleshy tip. Lower margin of preopercle somewhat rounded. An elongate gill raker at angle of first gill arch. First dorsal origin far behind tip of pectoral, slightly behind insertion of ventral and midway between hind border of eye and origin of soft dorsal. Ventral midway between eye and vent. Pectoral much shorter than postorbital length of head. Base of second dorsal 2.8 in interdorsal distance. Upper jaw with a single row of small teeth and a pair of canines on each side in front. Lower jaw with a backwardly directed symphyseal canine and a single row of vertically directed teeth behind, those posteriorly larger. Palatines with a series of 7-8 teeth; those anteriorly slightly larger. Colour: Blackish on back, whitish or silvery below lateral line. Median fins slightly dusky.

Local names: *Fandiyarutholi* (Minicoy). *Kolas* (Agathi).

Distribution: Laccadives in the Central Indian Ocean and Australia, Honolulu (Hawaii) and Marshall Islands in the Pacific.

Note: Schultz (1953) distinguished *helleri* from *novaehollandiae* mainly due to the absence of an elongate gill raker at the angle of the first gill arch in the latter. Smith (1956) reports that an elongate raker is present in *novaehollandiae* from Australia and considers the above two species as identical. He believed that a specimen captured near the islands of northern Mozambique which he was not able to secure for detailed study was of this species.

159. *Sphyraena chinensis* Lacépède

Sphyraena chinensis Lacépède, Hist. Nat. Poissons, 5, p. 324, pl. 10, fig. 2, 1803. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 61/114).
Sphyraenella flavicauda Smith, Ichth. Bull., 3, p. 38, pl. I, fig. 1, 1956.

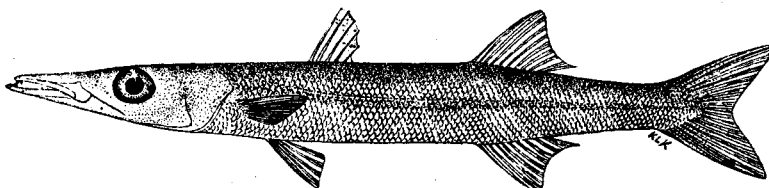


FIG. 159. *Sphyraena chinensis* Lacépède, 152 mm.

Specimens studied: Agathi (1), 152 mm. Ameni (4), 85 to 105 mm. Minicoy (3), 108 to 117 mm.

D₁. V; D₂. I, 9; A. II, 8-9; P. ii, 11-12; V. I, 5. Ll. 83-86; Ltr. 8+1+10-11.

Head 2.9-3.0 in standard length, 3.4-3.6 in total length. Depth of body 7.1-8.0 in standard length, 8.6-9.5 in total length. Eye 4.6-5.1 in head, 2.2-2.3 in snout and about 0.8 in interorbital space. Maxillaries reaching to below nostrils. Preopercle almost rectangular, its angle produced into a skinny flap. A long gill raker at angle of arch and another on lower limb. Operculum without spines. Upper jaw with a series of small teeth and two canines anteriorly on each side. Lower jaw with larger vertical teeth and a symphysial canine. Palatines with 6-9 teeth, 2 or 3 in front being canines. First dorsal spine much shorter than postorbital part of head and not higher than soft dorsal. Origin of first dorsal above or slightly behind tip of pectoral and behind base of ventral. Insertion of ventral midway between tip of snout and end of base of anal. Distance from tip of depressed first dorsal to insertion of second dorsal about equal to snout. Colour: Brownish on back, silvery below with a pale yellowish band from eye to caudal. Fins pale yellowish.

Local names: *Fandiyarutholi* (Minicoy). *Kolas* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Ryukyu Islands and south to Australia.

160. *Sphyraena chrysotaenia* Klunzinger

Sphyraena chrysotaenia Klunzinger, Fische Rothen Meeres, 1, p. 128, pl. 9, fig. 3, 1884. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 61/115).
Sphyraena obtusata Day, Fishes of India, p. 343, pl. 71, fig. 5, 1878 (not of Cuvier and Valenciennes). Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959 (not of Cuvier and Valenciennes).

Sphyraenella chrysotaenia Smith, Ichth. Bull., 3, p. 39, pl. 1, fig. 2, 1956. Dutt and Seshagiri Rao, Proc. Indian Acad. Sci., 65(B), p. 239, fig. 1 a, 1967.

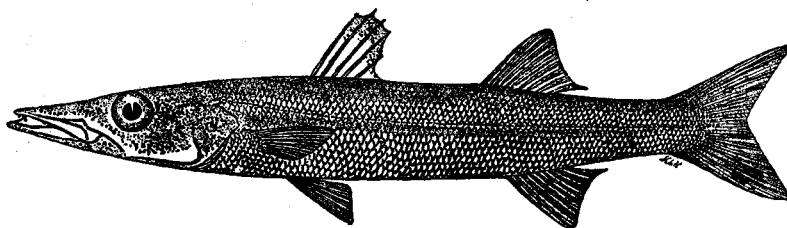


FIG. 160. *Sphyraena chrysotaenia* Klunzinger, 185 mm.

Specimens studied: Ameni (6), 85 to 110 mm. Minicoy (4), 118 to 185 mm.

D₁. V; D₂. I, 9; A. II, 8-9; P. ii, 12; V. I, 5. Ll. 84-87; Ltr. 6-8 + 1 + 11.

Head 2.9-3.1 in standard length, 3.5-3.8 in total length. Depth of body 6.2-6.8 in standard length, 7.4-8.0 in total length. Eye 5.0-5.5 in head, 2.2-2.5 in snout and slightly more than interorbital space. Maxillaries not reaching front border of eye, 2.4-2.5 in head. Preopercle almost rectangular, its angle produced into a flexible flap. Operculum without spines. One gill raker anterior to the one at angle. Upper jaw with a series of small teeth and two canines on each side in front. Lower jaw with a series of larger vertical teeth and a symphyseal canine. Palatines with 6-9 teeth, the anteriormost 2-3 canines. Origin of first dorsal anterior to a vertical through tip of pectorals and behind ventral insertion. Longest dorsal spine equal to or slightly longer than postorbital part of head and higher than soft dorsal. Ventral origin midway between tip of snout and end of base of anal. Distance from tip of depressed first dorsal to insertion of second dorsal less than length of maxillary. Pectoral longer than postorbital part of head. Ventral slightly shorter. Colour: Grayish with greenish tinge above, silvery below with a longitudinal band from eye to caudal. Fins pale yellowish.

Local names: *Fandiyarutholi* (Minicoy). *Kolas* (Ameni).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia and Philippines.

161. *Sphyraena barracuda* (Walbaum)

Esox barracuda Walbaum, Artedi Piscium, 3, p. 94, 1794.

Agriposphyraena barracuda Smith, Ichth. Bull., 3, p. 41, pl. 1, figs. 4 a, b and c, 1956.

Sphyraena barracuda Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 61/116).

Sphyraena commersonii Day, Fishes of India, p. 343, 1878.

Sphyraena picuda Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4; p. 224, 1922. Munro, Fishes of Ceylon, p. 90, pl. 16, fig. 246, 1955.

Sphyraena sphyraena var. *picuda* Bloch and Schneider, Syst. Ichth., p. 110, 1801.

Specimens studied: Ameni (3), 100 to 130 mm. Chetlat (3), 105 to 145 mm. Kalpeni (2), 205 and 330 mm. Minicoy (14), 130 to 575 mm.

D₁. V; D₂. I, 9; A. I, 8; P. ii, 11-12; V. I, 5. Ll. 79-83; Ltr. 10-11+1+14-15.

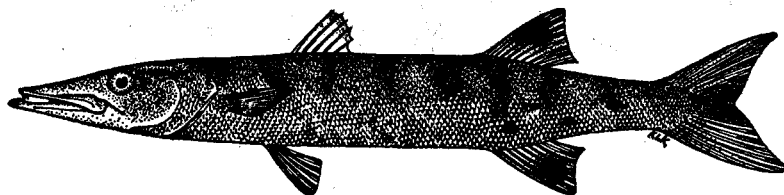


FIG. 161. *Sphyraena barracuda* (Walbaum), 330 mm.

Head 3.0-3.2 in standard length, 3.7-3.8 in total length. Depth of body 6.4-6.9 in standard length, 8.2-8.4 in total length. Eye 5.9-7.7 in head, 2.6-3.5 in snout and 1.3-2.0 in slightly concave (young) to flattish (adult) interorbital space. Maxillary reaching to below front edge or first third of eye, 2.2-2.3 in head. Angle of preopercle rounded. Operculum with two flat spines. Upper jaw with a series of small teeth and a pair of canines anteriorly on each side. Lower jaw with a series of vertical teeth, those behind larger and a canine at symphysis. Palatines with a row of 6-8 compressed canines. No elongate gill raker at angle of first gill arch, lower part of arch rough or with small spinules in juveniles. Origin of first dorsal above tip of pectorals, behind origin of ventrals and midway between tip of snout and end of base of second dorsal or nearer to the latter. Ventral nearer to anal fin than to tip of snout. Base of second dorsal 2.1-2.2 in interdorsal distance. Pectoral slightly shorter than postorbital part of head. Colour: Brownish with bluish tinge above, paler to whitish below. Sides above lateral line with dark vertical bars. Central area of soft dorsal and anal and middle rays of caudal dark. Middle rays of ventral slightly dark.

Local names: *Farutholi* (Minicoy). *Thiruthakkadayan* (other islands).

Distribution: Throughout the warmer parts of the Atlantic, Indian and Pacific Oceans.

162. *Sphyraena forsteri* Cuvier

Sphyraena forsteri Cuvier and Valenciennes, Hist. Nat. Poissons, 3, p. 353, 1829. Günther, Cat. Fish. Brit. Mus., 2, p. 337, 1860. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 223, 1922. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F: 61/117).
Callosphyraena toxéuma Smith, Ichth. Bull., 3, p. 42, pl. 2, fig. 5, 1956. Smith and Smith, Fishes of Seychelles, p. 45, pl. 34, D, 1963.

Specimens studied: Agathi (1), 408 mm. Minicoy (5), 455 to 480 mm.

D₁. V; D₂. I, 9; A. II, 8; P. ii, 12; V. I, 5. Ll. 117-122; Ltr. 15+1+19.

Head 3.1-3.2 in standard length, 3.7-3.8 in total length. Depth of body 7.7-8.1 in standard length, 9.1-9.3 in total length. Eye 5.4-5.7 in head, 2.6-2.7 in snout and 1.2-1.3 in flat interorbital space. Maxillary reaching behind a level from the nostrils, 2.2-2.3 in head. Angle of preoperculum rounded. Operculum with only the lower spine pointed. Lower jaw with projecting fleshy tip. Upper jaw with a row of small compressed teeth, with two canines on each side in front. Lower jaw with a symphyseal canine and a series of compressed teeth, those behind much larger and slanting posteriorly. Palatines with 7-8 compressed canines. Origin of first dorsal midway between front border of eye and second dorsal origin, above tip of pectorals and behind origin of ventrals. Ventral origin nearer to anal than to tip of snout. pectoral equal to or slightly longer than postorbital length of head. Ventral shorter than pectoral. Second spine of first dorsal longest, shorter than postorbital length of head. Last ray of soft dorsal and anal elongate. Base of second dorsal 2.25-2.5 in interdorsal distance. Origin of anal below second or third soft ray of anal. No elongate gill raker at angle, lower part of first gill arch with 12-14 low tubercles with 1-3 spines on each. Colour: Brownish, lower sides whitish to silvery. Soft dorsal and anal whitish, front half dark distally. Caudal dusky. Axil of pectoral with a dark blotch.

Local names: *Fandiyarutholi* (Minicoy). *Kolas* (Agathi).

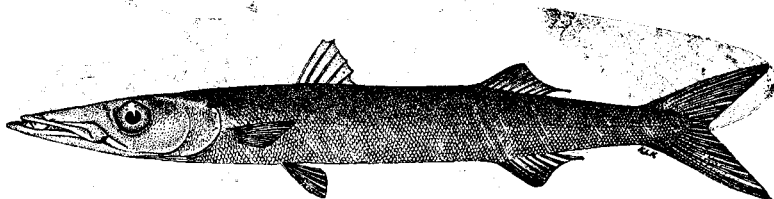


FIG. 162. *Sphyraena forsteri* Cuvier, 408 mm.

Distribution: From Bazaruto and Camores in the Western Indian Ocean to the Laccadives, Indonesia, Bikini Atoll, Fiji, Tahiti and Marquesas Islands.

Family MUGILIDAE

Body elongate, head slightly flattened above. Mouth small; upper lip broad and both lips usually with plicae or papillae of variable development along their edges; papillae sometimes absent. Teeth minute, in several close set rows or absent. Gill rakers long and slender. Eye sometimes with an adipose lid. Scales fairly large. No lateral line.

1. Lower lip broad, folded or directed slightly downward, with several rows of papillae with their tips crenulate; upper lip very broad, with papillae, the crenulate edge continuous around corner of mouth
..... *Crenimugil crenilabis*
- Lower lip with a thin edge, directed forward 2
2. Upper lip with two paired lobes, four lobes on each side at corner of mouth; lower lip at symphysis with edentulous notch, a lobe on each side of lower lip; edges of lips and lobes with fine papillae .. *Plicomugil labiosus*
- Upper lip with unfolded edges, no lobes at corner of mouth; anterior edge of preorbital concave or angular; posterior part of maxillary slightly exposed *Chelon seheli*

163. *Crenimugil crenilabis* (Forskål)

Mugil crenilabis Forskål, Descript. Animal., p. 73, 1775. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 256, 1922.

Crenimugil crenilabis Smith, Fishes of Southern Africa, p. 319, fig. 880, 1949. Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 650, fig. 8, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 62/118).

Mugil crenilabis Day, Fishes of India, p. 355, 1878.

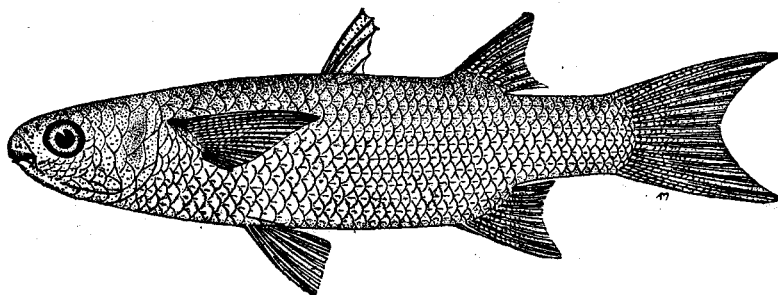


FIG. 163. *Crenimugil crenilabis* (Forskål), 142 mm.

Specimens studied: Ameni (6), 39 to 78 mm. Bangaram (4), 180 to 410 mm. Bitra (8), 87 to 129 mm. Chetlat (12), 39 to 103 mm. Kadamat (4), 108 to 142 mm. Kalpeni (16), 62 to 93 mm. Kavarathi (27), 42 to 108 mm. Minicoy (28), 48 to 112 mm.

D₁. IV; D₂. I, 8; A. III, 9; P. ii, 15; V. I, 5. Llat. 39-41; Ltr. 12-13.

Head 3.6-4.0 in standard length, 4.6-5.1 in total length. Depth of body 3.5-4.0 in standard length, 4.5-5.0 in total length. Eye without adipose lid, 3.5-4.3 in head, 0.8-1.0 in snout and 1.8-2.2 in almost flat interorbital space. Lower

border of preorbital with shallow emargination, tip of maxillary not exposed. Upper lip very broad, thick, with 5-6 series of papillae. Lower lip with a row of papillae except at symphysis. About 20 predorsal scales. First dorsal insertion midway between front border of eye and base of caudal and opposite to 12th or 13th lateral scale. Origin of second dorsal at level of 24th or 25th lateral scale and over rear of first third of anal base. Pectoral shorter than head. Colour: Dusky to greenish grey above, whitish on sides and below. Upper edge of base of pectoral with a blackish spot. Fins slightly dusky.

Local names: *Bengu* (Minicoy). *Thirutha* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, Andamans, Indonesia, Philippines, Japan and Marshall, Kingsmill, Society and Tuamotu Islands.

164. *Plicomugil labiosus* (Valenciennes)

Mugil labiosus Cuvier and Valenciennes, Hist. Nat. Poissons, **11**, p. 125, 1836. Day, Fishes of India, p. 357, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **4**, p. 259, 1922.

Plicomugil labiosus Jones and Kumaran, Indian J. Fish., **6**, p. 45, 1959. Smith and Smith, Fishes of Seychelles, p. 43, pl. 33, B, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 9, 1969 (Cat. No. CMFRI-LA-F. 62/119).

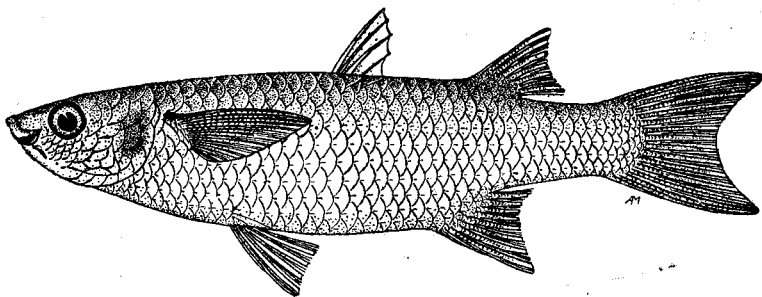


FIG. 164. *Plicomugil labiosus* (Valenciennes), 138 mm.

Specimens studied: Bitra (1), 134 mm. Kavarathi (1), 140 mm. Minicoy (1), 138 mm.

D₁. IV; D₂. I, 7-8; A. III, 9; P. ii, 15; V. I, 5. Llat. 34-36; Ltr. 11-12.

Head 4.0-4.2 in standard length, 5.0-5.2 in total length. Depth of body 3.7-3.8 in standard length, 4.7-4.8 in total length. Eye without adipose lid, 3.6-3.8 in head, equal to snout and 2.1-2.2 in almost flat interorbital space. Extremity of maxillary exposed. Upper lip thick, broad, symphysis with a groove

or concave edge, lower edge with a single row of papillae, a pair of lobes below edge on either side with a single row of papillae, lobes of lower lip with small papillae on sides and absent at symphysis. 19-20 scales before dorsal. Dorsal origin nearer to hind border of eye than to base of caudal and opposite to 11th-12th lateral scale. Origin of second dorsal opposite to 23rd or 24th lateral scale and above hind half of anal. Pectoral equal to head. Ventral slightly shorter than head without snout. Colour: Brownish above, whitish below. Upper edge of base of pectoral with a small black spot, dorsal rays of pectoral slightly blackish, rest of the fin whitish. Anterior rays of soft dorsal and anal dusky, posterior rays pale white. Caudal slightly dusky.

Local names: *Bengu* (Minicoy). *Thirutha* (other islands).

Distribution: Red Sea and Seychelles to the Laccadives, coasts of India, Andamans, Indonesia, Philippines and Marshall Islands.

165. *Chelon seheli* (Forsk.)

Mugil seheli Forsk., Descript. Animal., p. 73, 1775. Day, Fishes of India, p. 355, 1878.

Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 252, 1922.

Chelon seheli Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 62/120).

Valamugil seheli Smith, Fishes of Southern Africa, p. 323, fig. 889, 1949. Munro, Fishes of Ceylon, p. 92, pl. 16, fig. 254, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 650, fig. 9, 1962.

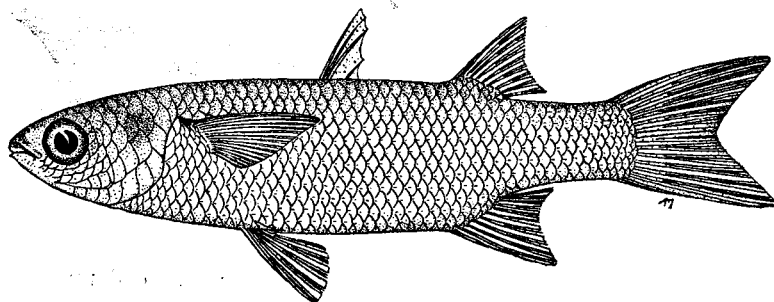


FIG 165. *Chelon seheli* (Forsk.), 76 mm.

Specimens studied: Agathi (9), 48 to 67 mm. Kavarathi (6), 62 to 78 mm. Minicoy (7), 60 to 76 mm.

D₁. IV; D₂. I, 8; A. III, 9; P. ii, 15-16; V. I, 5. Llat. 39-41; Ltr. 13-14.

Head slightly more than depth of body, 3.4-3.7 in standard length, 4.4-4.8 in total length. Eye without adipose lid, 3.6-3.8 in head, 0.7-0.8 in snout

and 1.6-1.8 in slightly convex interorbital space. Upper lip thin and without papillae. Lower lip without papillae and with a double symphyseal knob. Origin of first dorsal midway between front border of eye and base of caudal and above 11th-12th lateral scale. 21-22 predorsal scales. Origin of second dorsal slightly behind a level from that of anal and opposite to 23rd or 24th lateral scale. Pectoral shorter than head, reaching a vertical from dorsal origin. Colour: Light bluish green on back becoming silvery on sides and below. Dorsal, anal and caudal dusky. Upper edge of base of pectoral with a black spot.

Local names: *Bengu* (Minicoy). *Thirutha* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China and eastward to Caroline, Fiji and Samoan Islands.

Family ATHERINIDAE

Moderately elongate, subcylindrical or slightly compressed. Mouth moderate, terminal; intermaxillaries slightly protractile. Small teeth usually present on jaws, vomer and sometimes on palatines and pterygoids. Two separate dorsal fins, the first normally consisting of 4-8 weak spines and the second dorsal with a weak spine and some branched rays. Anal with a single spine and some branched rays. Gill membranes free from isthmus. Five or six branchiostegals. Scales moderate, cycloid or ctenoid. No lateral line.

1. Several spinules in rows on head, those at tip of snout and below eye prominent. A silvery lateral stripe with dark spots; a row of black spots above base of anal and along lower side of caudal peduncle
..... *Atherion africanus*
- No spinules on head. Vomer and pterygoids with teeth 2
2. Median ascending process of premaxillary long, extending to interorbital space. First lateral process of premaxillary slender; mandible elevated posteriorly. A silvery lateral stripe edged above with blackish; scale pockets above lateral band outlined with dark greenish spots
..... *Stenatherina temmincki*
- Ascending premaxillary process short, not extending to interorbital space
..... 3
3. Mandible posteriorly elevated. Hind border of preopercle with a concavity near lower corner. Vent slightly behind tips of ventral fins
..... *Allanetta barnesi*
- Mandible not elevated posteriorly. Vent between tips of ventral fins
..... *Pranesus pinguis*

166. *Atherion africanus* Smith

Atherion africanus Smith, Ichth. Bull., 31, p. 607, fig. 2, 1965. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 167, fig. 5, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 63/121).

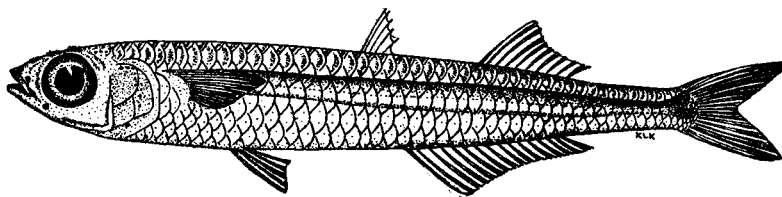


FIG. 166. *Atherion africanus* Smith, 31 mm. (after Jones and Kumaran)

Specimens studied: Kalpeni (11), 28 to 35 mm. Kavarathi (13), 22 to 33 mm. Minicoy (9), 22 to 34 mm.

D₁. V; D₂. I, i, 8-9; A. I, i, 14-16; P. i, 9-11; V. I, 5. Llat. 41-43; Ltr. 6. GR. 2-3 + 1 + 10-11.

Body fairly compressed, snout bluntly pointed. Head 4.3-4.6 in standard length, 5.0-5.4 in total length. Depth of body 5.7-6.2 in standard length, 6.7-7.4 in total length. Eye 2.8-3.1 in head, about 0.7 in snout and equal to or slightly less than interorbital space. Maxillary short, not reaching to below front margin of eye. Median ascending premaxillary process short. Mandibles slightly elevated posteriorly. Hind margin of preopercle broadly concave. A single series of teeth in jaws and a few teeth on vomer and pterygoid. Rows of spinules on snout, undersides of lower jaw, chin, preorbital, above the eye, interopercle and hind and lower border of preopercle. First dorsal origin midway between base of caudal and tip of snout. Vent below or slightly behind base of first dorsal and much nearer to insertion of anal than to tip of ventrals. 16-18 predorsal scales. Posterior edges of scales smooth. Colour: Pale whitish to translucent with a dark spotted silvery lateral stripe. Snout, chin and dorsal side of head and back with blackish spots. A row of black spots above base of anal and along lower side of caudal peduncle.

Local names: *Kudifitham* (Minicoy). *Uri*, *Tholiyan* (other islands).

Distribution: Known only from Zululand, Inhaca Island and Mozambique Island in the Western Indian Ocean and Laccadives in the Central Indian Ocean.

Note: According to Smith (1965) vomerine teeth are absent in this species. However, this character is highly variable as a few minute teeth are present on vomer in some specimens. This species appears to be nearest to *Atherion emylus* Jordan and Starks of the Pacific in all important characters and probably merits only subspecific rank.

167. *Stenatherina temmincki* (Bleeker)

Atherina temmincki Bleeker, Nat. Tijds. Ned.-Ind., 5, p. 506, 1853. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, 269, 1922.

Allanetta afra Smith, Ichth. Bull., 31, p. 621, pl. 98, C and fig. 5, 1965.

Stenatherina temmincki Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 63/122).

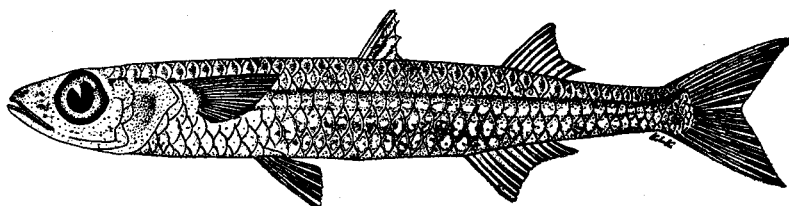


FIG. 167. *Stenatherina temmincki* (Bleeker). 73 mm.

Specimens studied: Agathi (18), 27 to 80 mm. Ameni (26), 23 to 70 mm. Androth (16), 37 to 59 mm. Bitra (11), 32 to 63 mm. Kadamat (6), 54 to 68 mm. Kalpeni (23), 29 to 64 mm. Kavarathi (28), 23 to 71 mm. Minicoy (87), 30 to 77 mm. Suheli (56), 28 to 58 mm.

D₁. V-VII; D₂. I, i, 8-9; A. I, i, 10-11(12); P. i, 15-16; V. I, 5. Llat. 42-45; Ltr. 6. GR. 5-6 + 1 + 19-22.

Body somewhat cylindrical, dorsal profile of head almost flat, snout bluntly conical. Head 3.8-4.1 in standard length, 4.6-5.0 in total length. Depth of body 5.7-6.4 in standard length, 6.8-7.6 in total length. Eye 2.7-3.1 in head, 0.7 in snout and equal to or slightly more than interorbital space. Maxillary reaching to below front border of eye. Side of maxillary with a slender lateral process. Ascending median premaxillary process extending to interorbital space. Mandible slightly elevated posteriorly. A distinct concavity above corner of preopercle. Minute teeth in narrow bands in jaws, vomer and palatines and a few teeth on pterygoid. Scales firmly embedded, margin of scales entire. Origin of first dorsal nearer to base of caudal than to tip of snout, opposite to 14th or 15th scale and opposite to or slightly behind level of vent. 17-19 predorsal scales. Vent between or slightly behind tip of ventrals. Origin of second dorsal opposite to 24th to 26th scale. 7-8 interdorsal scales. Pectoral 6.6-7.5 in total length and shorter than head without snout. Colour: Whitish to translucent with a silvery lateral stripe with blackish edge above. Scale pockets above lateral band outlined with dark greenish spots. Tip of snout, back of head and lower lip dark. A dark mid-dorsal line. Base of pectoral with dark spots. Fins hyaline; caudal sometimes slightly dusky.

Local names: *Himafitham* (Minicoy). *Tholiyan* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, Indonesia, Philippines and Marshall and Samoan Islands.

168. *Allanetta barnesi* (Schultz)

Hypoatherina barnesi Schultz, Bull. U.S. Nat. Mus., 202, 1, p. 304, 1953.

Allanetta barnesi Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 166, fig. 4, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 63/123).

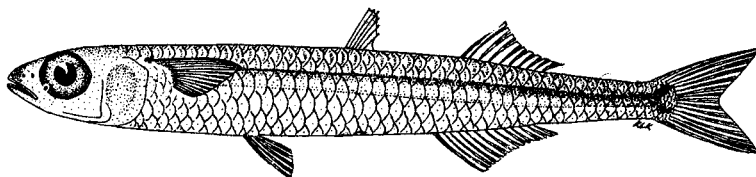


FIG-168. *Allanetta barnesi* (Schulz), 48 mm.

Specimens studied: Agathi (18), 34 to 50 mm. Bitra (6), 38 to 45 mm. Kavarathi (4), 33 to 46 mm. Minicoy (7), 35 to 48 mm.

D₁. VI-VII; D₂. I, i, 8-9; A. I, i, 11-13; P. i, 13-14; V. I, 5. Llat. 43-45; Ltr. 6. GR. 4-5 + 1 + 16-18.

Body slightly compressed, snout bluntly conical. Head 4.0-4.4 in standard length, 4.8-5.3 in total length. Depth of body 5.8-6.7 in standard length, 7-8 in total length. Eye 2.7-3.0 in head, about 0.6-0.7 in snout and equal to interorbital space. Maxillary reaching a vertical from front of eye. Median premaxillary process short, scarcely reaching above front margin of eye. Lateral process present on side of maxillary. Rami of mandibles distinctly elevated posteriorly. Hind border of preopercle with a concavity. Teeth minute in jaws, vomer and pterygoid. First dorsal origin nearer to base of caudal than to tip of snout and opposite to or slightly anterior to a vertical from vent. Vent 1 or 2 scales behind tip of ventrals. Pectoral 6.8-7.8 in total length. Scales thin, entire and deciduous. 17-18 predorsal scales. Colour: Translucent to slightly whitish with a broad silvery lateral band edged with dark above. Scale pockets on back with dusky edges; tip of snout, occiput, lower lip and base of pectoral dusky. Fins hyaline.

Local names: *Kudifitham* (Minicoy). *Uri*, *Tholiyan* (other islands).

Distribution: Laccadives in the Indian Ocean and Marshall islands in the Pacific.

Note: *Allanetta klunzingeri* Smith (1965) from the Western Indian Ocean appears to be closely related to this species. The main difference is in having I, i, 12-15 rays in the anal fin as against I, i, 11-13 in *A. barnesi*. The origin of first dorsal fin in the former is stated to be opposite to or slightly behind a vertical from vent, whereas in the latter it is opposite to or anterior to a vertical from vent.

169. *Pranesus pinguis* (Lacépède)

Atherina pinguis Lacépède, Hist. Nat. Poissons, 5, p. 372, pl. 11, fig. 1, 1803. Day, Fishes of India, p. 344, 1878.

Allanetta forskali Munro, Fishes of Ceylon, p. 95, pl. 16, fig. 264, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959.

Atherina forskali Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4 p. 274, 1922.

Atherina forskalii Day, Fishes of India, p. 345, pl. 71, fig. 4, 1878.

Hypsetia pinguis Smith, Fishes of Southern Africa, p. 325, pl. 68, fig. 894, 1949. Smith and Smith, Fishes of Seychelles, p. 43, pl. 33, H, 1963.

Pranesus pinguis Smith, Ichth. Bull., 31, p. 616, fig. 3, pl. 100, A, B and C, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 63/124).

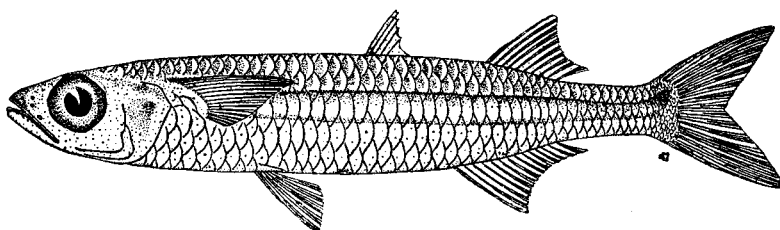


FIG. 169. *Pranesus pinguis* (Lacépède), 90 mm.

Specimens studied: Agathi (17), 23 to 87 mm. Ameni (8), 40 to 65 mm. Bangaram (13), 35 to 89 mm. Kalpeni (24), 26 to 98 mm. Kavarathi (27), 45 to 106 mm. Minicoy (146), 32 to 107 mm. Suheli (11), 56 to 83 mm.

D₁. V-VI; D₂. I, i, 8-9; A. I, i, 13-15; P. i, 15-16; V. I, 5. Llat. 41-44; Ltr. 6; Pred. 18-19. GR. 5-6+1+18-20.

Body slightly compressed. Head 3.6-3.9 in standard length, 4.4-4.9 in total length. Depth of body 4.6-5.2 in standard length, 5.7-6.4 in total length. Eye 2.5-2.9 in head, about 0.7 in snout and equal to or more or less than interorbital space. Maxilla reaching to a vertical through front edge of pupil. Mandible not elevated posteriorly. Ascending premaxillary process short, not extending in interorbital space. Hind preopercle margin with distinct concavity just above lower corner. Narrow band of minute teeth in jaws, vomer, palatines and a few teeth on pterygoid. Origin of first dorsal 2-3 scales behind level of vent, nearer to base of caudal than to front border of eye and opposite to 15th or 16th scale. Pectoral 5.6-6.3 in total length. Vent between tips of pelvic fins. First dorsal separated by 6-8 scales from second dorsal. Scales clearly embedded, hind margin smooth. Colour: Whitish with a silvery lateral stripe edged above with dark. Tip of snout and ventral border of lower jaw dark. Scale pockets above lateral band with dark greenish pigments and midline of the same

colour before dorsal. Base of pectoral, dorsal and anal with blackish pigments. Fins hyaline. Distal third of pectoral sometimes slightly dusky.

Local names: *Fitham* (Minicoy). *Tholiyan* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Japan, east to the Marianas, Marshall, Caroline and Samoan Islands and south to Australia.

Order POLYNEMIFORMES

Moderately elongate with ctenoid scales. Two dorsal fins. Ventral fins thoracic, pelvic bones supported by the postcleithra. Adipose eyelids present. Pectoral fins low down with the lower rays free, filamentous and attached to the fourth radial. Vertebrae 24.

Family POLYNEMIDAE

Body oblong and moderately deep. Snout obtusely conical and projecting beyond the mouth. Maxillaries without a supplemental bone. Small teeth in bands on jaws, palatines and sometimes on vomer. Eyes with an anterior and posterior eyelid. Two dorsal fins. Anal opposite to second dorsal. Pectoral with some of the lower rays free and filamentous. Gill membranes separate and not united with isthmus. Scales large or moderate, feebly ciliated. Lateral line complete, continued on the tail.

1. Five free pectoral filaments. L1. 60-63. Longest pectoral filament reaching beyond tip of ventrals. Yellowish with greyish tinge on back; narrow grey stripes along scale rows *Polynemus plebeius*
Six or seven free pectoral filaments 2
2. Six free pectoral filaments. L1. 59-63. Longest pectoral ray reaching almost to tip of ventrals. Silvery; upper part of first dorsal and lobe of second dorsal slightly blackish. Pectoral often blackish *Polynemus sexfilis*
Seven free pectoral filaments. L1. 50. Longest pectoral ray reaching beyond tip of ventrals. Silvery, back grey to slightly brownish. Edges of first dorsal, second dorsal, anal and margin of caudal dark. Pectoral blackish *Polynemus heptadactylus*

170. *Polynemus plebeius* Broussonet

Polynemus plebeius Broussonet, Ichthyologia, p. 23, pl. 8, 1782. Day, Fishes of India, p. 179, 1878. Munro, Fishes of Ceylon, p. 97, pl. 17, fig. 271, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 64/125).

Polydactylus plebeius Smith, Fishes of Southern Africa, p. 327, fig. 898, 1949.

Polynemus plebeius Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 202, 1922.

Specimens studied: Agathi (1), 57 mm. Chetlat (3), 80 to 84 mm. Mini-coy (8), 40 to 93 mm.

D₁. VIII; D₂. I, 13; A. III, 11; P. 17+5; V. I, 5. L1. 60-63; Ltr. 6+1+13. GR. 10-11+1+13-14.

Head 3.1-3.2 in standard length, 4.2-4.3 in total length. Depth of body 3.2-3.3 in standard length, 4.3-4.5 in total length. Eye 3.6-4.1 in head. 0.6-0.7 in snout and equal to interorbital space. Maxillaries scaly. Anterior nostril equidistant between tip of snout and eye. Preoperculum serrated, its angle produced and rounded. Teeth in narrow bands in jaws and palatines and a small patch on vomer. First spine of dorsal minute, second shorter than third. Second dorsal origin in front of a vertical from anal origin, its spine equal to or slightly longer than the third spine of anal. Pectoral rays simple, as long as postorbital length of head with half eye diameter. Longest pectoral filament reaching beyond tip of ventral. Ventral equal to or slightly shorter than postorbital length of head. Colour: Yellowish with greyish tinge on back and narrow grey stripes along each row of scales. Fins hyaline, edges of first dorsal, second dorsal and pectoral dusky.

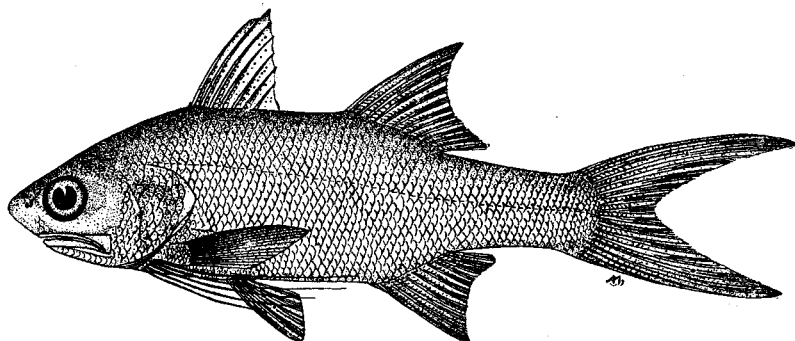


FIG. 170. *Polynemus plebeius* Broussonet, 93 mm.

Local names: *Kela* (Minicoy). *Mookan*^k_n (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Taiwan and Solomon, Fiji, Tahiti and Marquesas Islands and south to Australia.

171. *Polynemus sexfilis* Valenciennes

Polynemus sexfilis Cuvier and Valenciennes, Hist. Nat. Poissons, 7, p. 515, 1831. Day, Fishes of India, p. 178, pl. 43, fig. 1, 1878. Munro, p. 97, pl. 17, fig. 270, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. CMFRI-LA-F. 64/126).

Specimens studied: Agathi (10), 47 to 75 mm. Ameni (7), 55 to 105 mm. Chetlat (14), 38 to 78 mm. Kadamat (6), 46 to 72 mm. Kavarathi (1), 253 mm. Minicoy (47), 38 to 112 mm. Thinnakara (11), 35 to 265 mm.

D₁. VIII; D₂. I, (12)13; A. III, 11(12); P. 15-16+6; V. I, 5. L1. 59-63; Ltr. 7+1+12-13. GR. 11-13+1+14-16.

Head 3.0-3.3 in standard length, 4.3-4.7 in total length. Depth of body 3.2-3.5 in standard length, 4.4-4.8 in total length. Eye 3.5-5.0 in head, 0.6-1.2 in snout and 0.9-1.5 in convex interorbital space. Maxillary naked. preoperculum serrated, its angle produced as a triangular flap. Teeth in narrow bands in jaws and palatines and in a patch on vomer. Soft dorsal origin in front of a vertical through anal origin. First spine of first dorsal minute, second shorter than third. Spine of second dorsal longer than third spine of anal. Height of second dorsal almost equal to length of head. Caudal with long pointed lobes. Pectoral rays undivided, half eye diameter longer than postorbital length of head. First pectoral filament reaching behind tip of ventral in juveniles but not to tip in adults. Ventral slightly shorter than postorbital length of head. Colour: Silvery. Dorsal and anal hyaline, upper part of first dorsal and lobe of second dorsal slightly blackish. Outer margin of caudal dark. Pectoral often blackish.

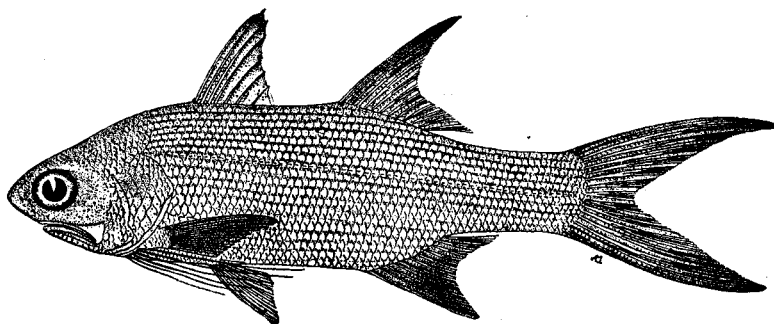


FIG. 171. *Polynemus sexfilis* Valenciennes, 170 mm.

Local names: *Kela* (Minicoy). *Mookkan* (other islands).

Distribution: Mauritius and Seychelles to the Laccadives, coasts of India, Ceylon, Woodlark island, New Britain and Marshall islands.

172. *Polynemus heptadactylus* Cuvier

Polynemus heptadactylus Cuvier and Valenciennes, Hist. Nat. Poissons, 3, p. 300, 1829. Day, Fishes of India, p. 177, pl. 42, fig. 5, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 4, p. 212, 1922. Munro, Fishes of Ceylon, p. 96, pl. 17, fig. 267, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 9, 1969 (Cat. No. OMFRI-LA-F. 64/127).

Specimen studied: Minicoy (1), 107 mm.

D₁. VIII; D₂. I, 13; A. III, 12; P. 15+7; V. I, 5. L1. 50; Ltr. 5+1+11. GR. 15+1+23.

Head 3.3 in standard length, 4.6 in total length. Depth of body 3 in standard length, 4.3 in total length. Eye 3.7 in head, 0.6 in snout and equal to slightly convex interorbital space. Maxillaries scaly. Preoperculum serrated,

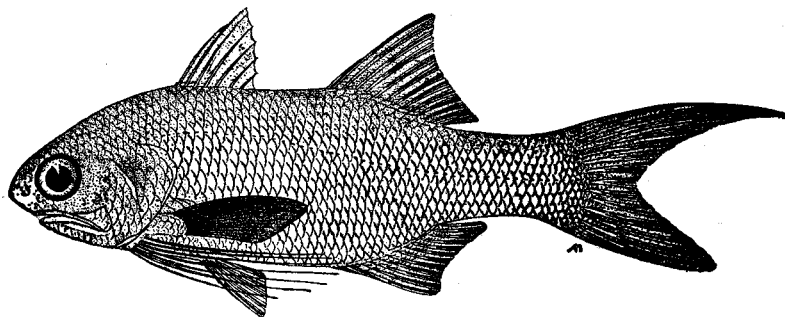


FIG. 172. *Polynemus heptadactylus* Cuvier, 107 mm.

with a larger spine above its somewhat rounded angle. Teeth in narrow bands on jaws and palatines and in a small patch on vomer. First spine of first dorsal minute and the second shorter than the third. Second dorsal origin in front of a level from the anal, its spine equal to third anal spine. First anal spine minute. Height of second dorsal slightly more than that of first dorsal and anal. Pectoral rays undivided, equal to head without snout. Third, fourth and fifth pectoral filaments longer than others, reaching beyond tip of ventrals. Colour: Silvery, grey to slightly brownish on back. Pectoral blackish. Edges of first dorsal, second dorsal, anal and margin of caudal dark.

Local name: *Kela* (Minicoy).

Distribution: Laccadives, coasts of India and Ceylon to Malaysia and Indonesia.

Order PERCIFORMES

Physoclists. Mostly two dorsal fins, the first normal or united with the second basally. Ventrals often thoracic, with not more than 6 rays. Pelvic bones usually attached to the cleithra. No orbitosphenoid. No weberian apparatus.

Suborder PERCOIDEI

Body elevated, oval to elongate. Mouth sometimes protractile, terminal or subterminal. Fins generally with spines. Dorsal fin continuous, notched or divided into two distinct parts. Ventrals thoracic or jugular, rarely absent. Scales small or large, sometimes modified or completely absent. Lateral line often complete, sometimes interrupted or absent. Gill openings wide and gill membranes usually free from isthmus.

1. A single nostril on each side of snout 2
 2 nostrils on each side of snout 3
2. Anal fin with 2 spines POMACENTRIDAE
 Anal fin with 3 or more spines CICHLIDAE
3. Only $3\frac{1}{2}$ gills present 4
 4 complete gills present 5
4. Teeth in jaws partly or wholly fused CALLYDONTIDAE
 Teeth in jaws separate and normal LABRIDAE
5. Lower rays of pectoral simple and thickened CIRRHITIDAE
 Lower rays of pectoral branched and similar to the rays above them 6
6. Anal fin usually with not more than one spine 7
 Anal fin with two or more spines 14
7. Two distinct dorsal fins 8
 One dorsal fin; spinous and soft portions sometimes subdivided by a notch
 9
8. Two barbels behind symphysis of lower jaw; lateral line single .. MOLLIDAE
 No barbels behind symphysis of lower jaw; two lateral lines
 CHAMPSODONTIDAE
9. Ventrals absent; rays of dorsal and anal fins simple; no lateral line
 SCHINDLERIIDAE
 Ventrals present; dorsal and anal fins with spines or simple rays and branched
 rays; lateral line present 10
10. Origin of dorsal fin on head; skin with small embedded scales; caudal fin with
 long pointed lobes CORYPHAENIDAE
 Origin of dorsal fin behind head; skin naked or with large scales; caudal fin
 rounded, emarginate or forked but without pointed lobes 11

11. Body compressed, nearly orbicular; belly sharp; skin smooth and naked; anal origin close to bases of long ventral fins MENIDAE
 Body rounded and moderately elongated; belly bluntly rounded; body covered with distinct scales; origin of anal well behind bases of ventrals 12
12. Origin of ventrals behind bases of pectorals; no teeth on vomer; more than 120 scales in lateral line; anal fin with more than 38 rays
 MALACANTHIDAE
 Origin of ventrals slightly before bases of pectorals; vomerine teeth present; less than 75 scales in lateral line; anal fin with less than 35 rays 13
13. Body very elongate; depth 13-14 in standard length; lower jaw with projecting fleshy knob; dorsal fin with more than 45 rays; ventrals longer than head TRICHONOTIDAE
 Body shorter; depth 4.0-6.5 in standard length; lower jaw without fleshy knob; 4-5 strong spines and 19-23 rays in dorsal; ventrals shorter than head PARAPERCIDAE
14. Body orbicular or depth subequal or greater than standard length 15
 Body elongate or oval, always longer than deep 16
15. Ventral fins minute or vestigial; mouth not protractile; teeth villiform
 MONODACTYLIDAE
 Ventral fins elongated; mouth protractile; teeth tricuspid PLATACIDAE
16. Anteriorly two spines detached from the anal fin; lateral line usually with enlarged scutes posteriorly CARANGIDAE
 No detached spines anterior to anal fin 17
17. Two separated dorsal fins. Preoperculum with an inframarginal ridge
 APOGONIDAE
 Dorsal fin continuous; the spinous and rayed portions fully united or divided by a notch 18
18. Dorsal fin deeply notched; the spinous and rayed parts of the fin connected by a vestigial membrane; anal with 2 spines; opercle with 2 soft flat spines
 SCIAENIDAE
 Spinous and rayed parts of the dorsal fin continuous; anal with 3 or more spines 19
19. A scaly process in axil of ventral fins 20
 No scaly process in axil of ventral fins 33
20. Palatines with well developed teeth 21
 No teeth on palate 23
21. Spines of dorsal fin increasing in length towards the rayed part; 26-43 anal rays PEMPHERIDAE
 Middle spines of dorsal fin slightly longer than the posterior ones; 7-18 anal rays 22

22. Jaws with narrow band of villiform teeth and with an outer row of narrow incisors **KYPHOSIDAE**
 Jaws with several rows of small pointed teeth; outer row enlarged and those in front sometimes fang-like **LUTIANIDAE**
23. Body elongate and subcylindrical; dorsal notched .. **EMMELICHTHYIDAE**
 Body moderately elongate, oblong or deep, compressed; dorsal not notched 24
24. Mouth protractile 25
 Mouth not protractile 27
25. Teeth in jaws fine and setiform; scales extending over most of the dorsal and anal fins; jaws moderately protractile **CHAETODONTIDAE**
 Teeth in jaws setiform or small and pointed and often in a single series; dorsal and anal with scaly basal sheath; jaws extremely protractile 26
26. Top of head with bony ridges and a nuchal spine; scales small; gill membranes attached to isthmus **LEIOGNATHIDAE**
 Top of head without ridges and nuchal spine; scales large; gill membranes free from isthmus **GERRIDAE**
27. Preoperculum completely naked **LETHRINIDAE**
 Preoperculum with 3 or more rows of scales 28
28. Teeth small, in villiform bands in jaws; no anterior canines or incisiform teeth; pectoral fin broadly rounded **LOBOTIDAE**
 Teeth conical or molariform, in several rows; canines sometimes present anteriorly 29
29. Preorbital naked; preopercle entire; dorsal and anal spines weak 30
 Preorbital scaly; preopercle serrated; dorsal and anal spines robust 32
30. A distinct bony process on intermaxilla sliding beneath the maxilla **CAESIODIDAE**
 No bony process on intermaxilla 31
31. A distinct backwardly directed spine on suborbital **SCOLOPSIDAE**
 No distinct spine on suborbital **PENTAPODIDAE**
32. 4-9 rows of scales above lateral line; a median groove below chin and 2 pores; scales small **POMADASYIDAE**
 More than 10 rows of scales above lateral line; no groove below chin but 6 pores behind lower lip; scales larger **GATERINIDAE**
33. Lateral line incomplete and terminating below the dorsal fin or divided into an upper and lower portion 34
 Lateral line complete 36
34. Ventral with 1 spine and 4 rays, reaching origin of anal fin; 11-13 spines in dorsal fin **PLESIOPIDAE**
 Ventral with 1 spine and 5 rays, not reaching to the vent; 3-7 spines in dorsal fin 35

35. 3 slender dorsal spines; no spine on margin of preopercle PSEUDOCHROMIDAE
 7 stiff dorsal spines; a strong spine on margin of preopercle PSEUDOGRAMMIDAE
36. Teeth in jaws in brush-like bands; a strong spine at angle of preopercle POMACANTHIDAE
 Teeth in jaws not in brush-like bands; generally no strong spine at angle of preopercle 37
37. Maxilla with a supplemental bone; inner rows of teeth enlarged and depressible SERRANIDAE
 Maxilla without a supplemental bone; inner rows of teeth not enlarged and not depressible 38
38. 11-13 dorsal spines THERAPONIDAE
 10 dorsal spines 39
39. 16-19 dorsal rays; anal with 7-9 rays; curved canines sometimes present ANTHIIDAE
 10-15 dorsal rays; anal with 9-16 rays; no curved canines 40
40. Maxilla scaly; eyes very large; inner rays of ventrals united to the abdomen by membrane PRIACANTHIDAE
 Maxilla naked; eyes moderate; inner rays of ventrals not united broadly to the abdomen KUHLIIDAE

Family SERRANIDAE

Body robust, oblong, compressed and covered with small or moderate scales. Mouth large, maxillary broader posteriorly. Teeth in bands, villiform or conical, inner series generally enlarged and depressible and enlarged caniniform teeth in front. Teeth present on vomer and palatines. Hind border of preoperculum normally serrated. Two nostrils on each side. A single dorsal fin consisting of strong spines and soft rays. Anal generally with three spines. Lateral line complete. Base of dorsal, anal and caudal fins scaled.

1. Preoperculum with strong spines. Scales very small, cycloid, deeply embedded. Ventrals slightly before origin of pectorals. Chin with a rudimentary dermal appendage *Grammistes sexlineatus*
 Preoperculum moderately serrate or entire 2
2. Dorsal VII-VIII, 11-12. Anal and ventral spines weak and flexible. Lower border of preoperculum with strong antrorse spines. Reddish brown with dark brown spots *Plectropomus maculatus*
 Dorsal IX-XI, 14-18. Lower border of preoperculum without antrorse spines. Anal and ventral spines strong 3

3. Two fixed curved canines on each side of mandible. Caudal fin deeply concave. Yellowish red with numerous yellow spots *Variola louti*
 No fixed curved canines on sides of mandible. Caudal rounded or truncate 4
4. IX dorsal spines 5
 XI dorsal spines 9
5. Anal with 8 soft rays 6
 Anal with 9 soft rays 7
6. Second anal spine much shorter than soft anal rays. Yellowish brown with bluish black lines on head, sides of body and often extending on to vertical fins and pectorals *Cephalopholis boenack*
 Second anal spine slightly shorter than soft anal rays. Brown with darker vertical bars on sides *Cephalopholis pachycentron*
7. Generally 18 soft dorsal rays. Depth of body, about 2.4. Colour uniform dark brown *Cephalopholis rogaa*
 14-16 soft dorsal rays. Depth of body 2.6-3.1 8
8. Head and anterior part of body with bluish or dark mesh work or reticulations. Vertical fins with dark border *Cephalopholis sonnerati*
 Bluish brown; dark edged bluish spots on head, body and fins; edges of soft dorsal, anal, caudal and pectoral fins white *Cephalopholis argus*
 Brown; head, body and median fins with small brown spots with bluish centre; chest and abdomen not spotted; dorsal and anal edged dusky *Cephalopholis miniatus*
9. Caudal truncate or slightly emarginate. Depth 2.5 in standard length. Head and body dark purplish blue; tip of snout, caudal peduncle and fins yellowish *Epinephelus flavocaeruleus*
 Caudal rounded 10
10. Depth of body about 3. Brown with white patches on body; two dark stripes from eye to opercular border *Epinephelus morrhua*
 Colour not as above 11
11. Last dorsal spine much shorter than third dorsal spine. Head, body and vertical fins with dark blotches *Epinephelus corallicola*
 Last dorsal spine not or slightly shorter than third dorsal spine 12
12. Opercular spines equidistant 13
 Middle opercular spine closer to the lower than to the upper 14
13. Maxillary reaching scarcely to below hind border of eye. Uniform yellowish brown with six dark transverse bands. Margin of spinous dorsal dark *Epinephelus fasciatus*
 Maxillary to below hind border of eye. Indistinct dark cross bars and brown spots on head, body and median fins *Epinephelus tauvina*

14. A distinct black blotch or black saddle on dorsal edge of caudal peduncle 15
 No prominent black blotch or black saddle on dorsal edge of caudal peduncle 16
15. Yellowish to brownish with small dark brown spots on head and body; five irregular dark brown blotches or bars on sides and another on dorsal edge of caudal peduncle *Epinephelus fuscoguttatus*
 Whitish to grey, covered with hexagonal dark brown spots separated by narrow interspaces; five large blackish blotches along back of which two along base of spinous dorsal, two along base of soft dorsal and one on upper side of caudal peduncle *Epinephelus hexagonatus*
16. Brown with white patches on sides of body, dorsal fin and basal and upper part of caudal *Epinephelus caeruleopunctatus*
 Light brownish to brown with dark spots 17
17. No dark blotch along base of dorsal fin. Depth 3.0-3.2 18
 1 to 4 black blotches along base of dorsal fin, depth 3.2-3.5 19
18. Ltr. 16+1+46. Brown with several small blackish spots on head and body. Fins with dark spots *Epinephelus fario*
 Ltr. 11-13+1+30-34. Greyish to light brownish with large, somewhat hexagonal dark brown spots on head, body and fins; spots ventrally on body widely spaced *Epinephelus merra*
19. Light brownish with somewhat round, dark brown spots smaller than interspaces between them; a blackish blotch below bases of 8th to 11th dorsal spines. Pectoral generally shorter than half length of head. Longest dorsal spine shorter than half length of postorbital part of head *Epinephelus elongatus*
 Light brownish with hexagonal, dark brown spots separated by narrow interspaces, those on lower sides somewhat round and widely separated; a large black blotch below 8th to 11th dorsal spines. Pectoral slightly longer than half length of head. Longest dorsal spine slightly more than half length of postorbital part of head *Epinephelus melanostigma*

173. *Grammistes sexlineatus* (Thunberg)

- Perca sexlineata* Thunberg, Vet. Akad. Nya Handlingar Stockholm, 13, p. 142, pl. 5, 1792.
Grammistes orientalis Day, Fishes of India, p. 28, pl. 9, fig. 1, 1878.
Grammistes sexlineatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 4, fig. 1, 1931. Smith, Fishes of Southern Africa, p. 190, pl. 18, fig. 418, 1949.
 Munro, Fishes of Ceylon, p. 109, pl. 18, fig. 286, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/128).

Specimens studied: Agathi (1), 33 mm. Kalpeni (4), 40 to 83 mm. Kada-mat (1), 42 mm. Minicoy (5), 35 to 90 mm.

D. VII, 14; A. II, 9; P. i, 16; V. I, 5. Llat. 65-74; Ltr. 11-14+1+34-40.

Head 2.5-2.7 in standard length, 3.3-3.4 in total length. Depth of body 2.4-2.6 in standard length, 3.1-3.3 in total length. Eye 4.4-4.6 in head, 0.8 in snout and 0.7 in somewhat convex interorbital space. Maxillary reaching to somewhat behind hind border of eye. Chin with a rudimentary dermal appendage. Preoperculum with 3 distinct spines on hind edge. Four or five rows of small teeth in jaws and a patch of teeth on vomer and two rows on palatines. Pectoral equal to postorbital length of head. Ventral $1/3$ eye diameter shorter than pectoral. Colour: Dark brown with five or six yellowish longitudinal bands which become narrow and may increase in number upto 9 with age. In young specimens only 3 longitudinal bands are present. Spinous dorsal brownish. Other fins yellowish, slightly brownish at base.

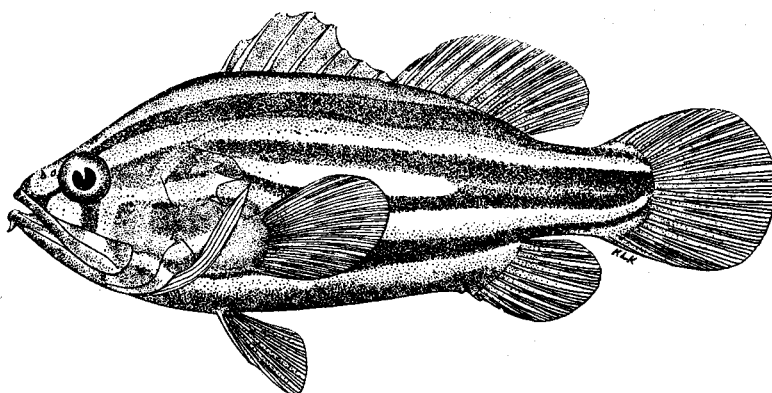


FIG. 173. *Grammistes sexlineatus* (Thunberg), 70 mm.

Local names: *Haravalufana* (Minicoy). *Kotha* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Philippines, North Australia, eastwards to Marquesas and Tuamotu Islands.

174. *Plectropomus maculatus* (Bloch)

Bodianus maculatus Bloch, Naturges, Ausländ. Fische, 3, p. 48, pl. 228, 1790.

Plectropoma maculatum Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 77, fig. 8, 1931.

Plectropomus leopardus Munro, Fishes of Ceylon, p. 109, pl. 18, fig. 288, 1955.

Plectropomus maculatus Munro, Fishes of Ceylon, p. 109, pl. 18, fig. 287, 1955. Smith and Smith, Fishes of Seychelles, p. 13, pl. 96, A, B and C, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/129).

Specimens studied: Minicoy (2), 237 and 760 mm.

D. VII, 12; A. III, 8; P. ii, 14; V. I, 5. Llat. 110; Ltr. 20+58.

Head 2.9 in standard length, 3.6 in total length. Depth of body 3.4 in standard length, 4.2 in total length. Eye 6.5-6.8 in head, about 1.7-1.9 in snout and 1.4-1.5 in interorbital space. Mouth oblique, maxillary reaching to below hind border of eye. Intermaxillary with a band of cardiform teeth, a pair of canines near symphysis; lower jaw with two unequal series of teeth, a pair of short canines in front and three canines laterally on each side; the inner series in both jaws depressible. Vomer and palatines with slender teeth. Three antrorse spines on lower border of preoperculum. Third or fourth dorsal spine longest, about twice eye diameter. Anal and ventral spines slender. Pectoral less than half length of head. Ventral equal to pectoral. Soft dorsal and anal obtusely rounded. Colour: Reddish brown, lighter below with dark brown ocelli on head and body. Vertical fins pale yellowish, covered with small dark brown ocelli, soft dorsal and caudal with narrow white distal margin. Pectoral and ventral pale yellowish with brown ocelli at their bases.

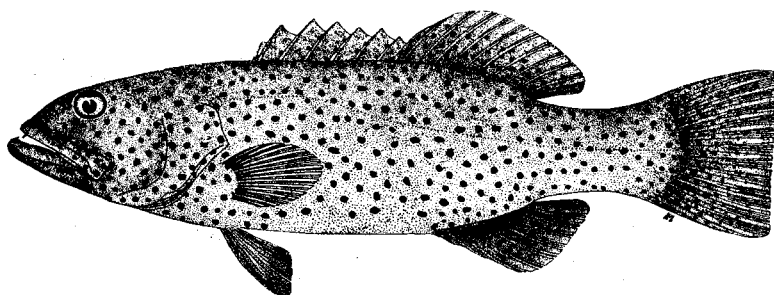


FIG. 174. *Plectropomus maculatus* (Bloch), 237 mm.

Local name: *Gorang* (Minicoy).

Distribution: Red Sea and east coast of Africa to the Laccadives, Ceylon, Indonesia, Philippines, China, Japan, Palau, Fiji, Samoan and Tuamotu Islands and south to Australia.

175. *Variola louti* (Forskål)

Perca louti Forskal, Descript. Animal., p. 40, 1775.

Variola louti Day, Fishes of India, p. 26, pl. 7, fig. 3, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 12, fig. 4, 1931. Smith Fishes of Southern Africa, p. 192, pl. 17, fig. 426, 1949. Munro, Fishes of Ceylon, p. 109, pl. 18, fig. 289, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/130).

Specimens studied: Ameni (1), 185 mm. Kadamat (1), 276 mm. Kavarithi (1), 290 mm. Minicoy (4), 180 to 235 mm.

D. IX, 14; A. III, 8; P. i, 17; V. I, 5. Llat. 108-117; Ltr. 12-14+1+47-55.

Head 2.4-2.6 in standard length, 3.3-3.5 in total length. Depth of body 2.8-3.0 in standard length, 3.8-4.1 in total length. Eye 5.8-6.5 in head, less than twice in snout and equal to or slightly more or less than interorbital space. Maxillary reaching to below hind border of eye. Teeth villiform in jaws within, outer row of short and thick teeth; two canines on each side in upper jaw near symphysis, and two canines on each side of mandible in addition to those in front. Longest dorsal spine twice eye diameter. Third anal spine longer than second, only slightly shorter than the longest dorsal spine. Pectoral equal to postorbital part of head plus $\frac{1}{3}$ eye diameter. Ventral with slightly produced first ray, equal to or shorter than head without snout. Caudal deeply emarginate. Colour: Yellowish red, back and sides with brownish tinge. Head and body with irregular yellow spots, those on head smaller than those on body. Dorsal, anal, caudal and basal part of pectoral with similar spots edged darker. Posterior rays of dorsal and anal and posterior margin of caudal yellow and devoid of spots. Pectoral dusky, distal portion yellowish.

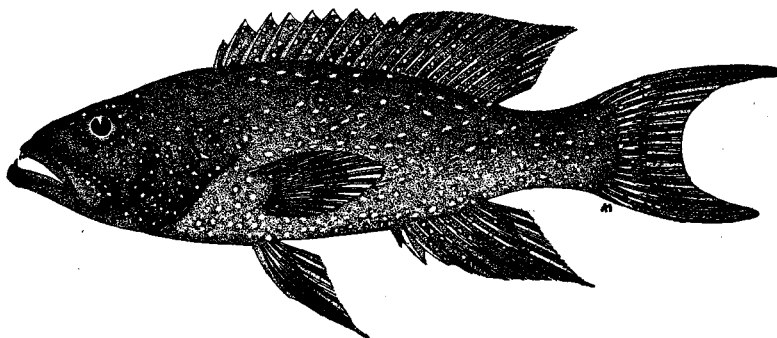


FIG. 175. *Variola louti* (Forsk.), 235 mm.

Local names: *Kanduryhou* (Minicoy). *Chencheerachammam*, *Kathivalan* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Okinawa, Caroline, Society and Tuamotu Islands.

176. *Cephalopholis boenack* (Bloch)

Bodianus boenack Bloch, Naturges. Ausl nd. Fische, 4, pl. 226, p. 43, 1790.

Cephalopholis boenack Munro, Fishes of Ceylon, p. 110, pl. 18, fig. 291, 1955. Jones Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/131).

Epinephelus boenack Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 20, fig. 6, 1931.

Serranus boenack Day, Fishes of India, p. 23, pl. 6, fig. 1, 1878.

Specimens studied: Agathi (2), 180 and 190 mm. Minicoy (2), 120 and 162 mm. Suheli (1), 145 mm.

D. IX, 16; A. III, 8-9; P. i, 16; V. I, 5. Llat. 94-106; Ltr. 12-15+1+30-34.

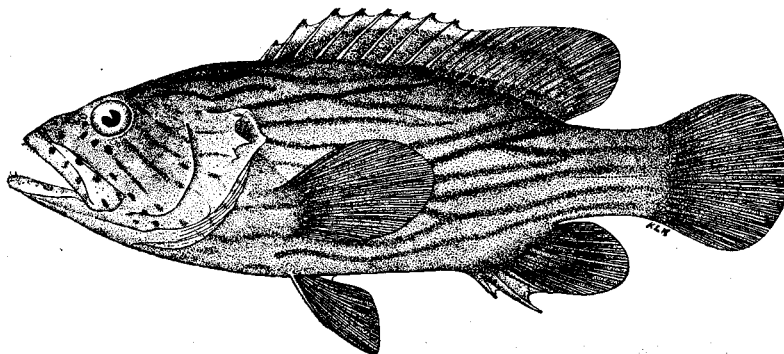


FIG. 176. *Cephalopholis boenack* (Bloch), 162 mm.

Head 2.5-2.6 in standard length, 3.1-3.2 in total length. Depth of body 2.7-2.9 in standard length, 3.4-3.6 in total length. Maxilla reaching to a vertical from the hind border of eye. Outer row of teeth in the upper and inner row of teeth in the lower jaw larger than others; a pair of moderate canines in each jaw near symphysis. Fourth or fifth dorsal spine longest, $1\frac{1}{2}$ eye diameter in length. Second anal spine longer than 3rd, about equal to longest dorsal spine. Pectoral equal to postorbital part of head plus $\frac{1}{2}$ eye diameter. Ventral about an eye diameter shorter than pectoral. Colour: Yellowish brown, somewhat paler below. Cheek with bluish black spots. Undulating bluish black lines on head and sides of body sometimes continued on to vertical fins. Membranes of spinous dorsal tipped black. Pectoral and caudal dark brownish.

Local name: *Varianchammam* (other islands).

Distribution: Widely distributed from the east coast of Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Japan and Australia.

177. *Cephalopholis pachycentron* (Valenciennes)

Serranus pachycentron Cuvier and Valenciennes, Hist. Nat. Poissons, 2, p. 295, 1828.

Cephalopholis pachycentron Munro, Fishes of Ceylon, p. 293, pl. 18, fig. 293, 1955. Smith, Fishes of Southern Africa, p. 504, pl. 102, fig. 425a, 1961. Smith and Smith, Fishes of Seychelles, p. 15, pl. 12, G, 1963.

Epinephelus pachycentron Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 19, 1931.

Specimen studied: Minicoy (1), 104 mm.

D. IX, 16; A. III, 8; P. i, 15; V. I, 5. Llat. 85; Ltr. 10+1+33.

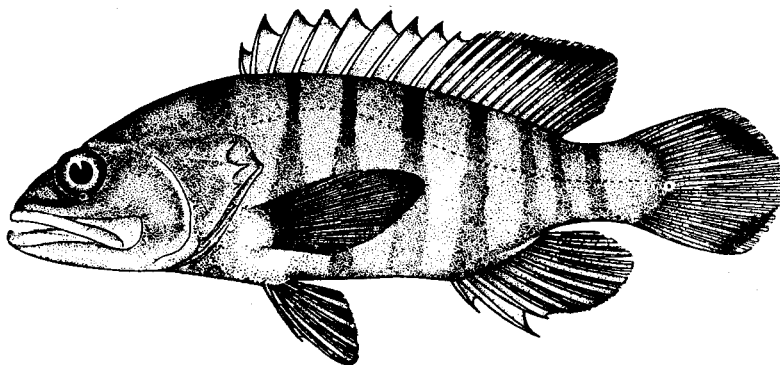


FIG. 177. *Cephalopholis pachycentron* (Valenciennes), 104 mm.

Head 2.5 in standard length, 3.1 in total length. Depth of body 3 in standard length, 3.7 in total length. Eye 4.9 in head, 1.1 in snout and 0.7 in interorbital space. Maxillary reaching beyond a vertical through hind border of eye. Hind border of preopercle finely serrated, its angle rounded. Third or fourth dorsal spine longest, about thrice in head. Second anal spine longer than third spine and slightly shorter than longest anal ray. Pectoral equal to postorbital length of head and half eye diameter. Ventral slightly longer than half length of head. Soft dorsal, anal and caudal rounded. Colour: Brown with eight dark brown vertical bars on sides. Median fins brown; tips of spinous dorsal black; soft dorsal with light margin. Upper and lower corners of caudal black with a narrow light outer margin. Pectoral and ventral brownish.

Distribution: Widely distributed in the Indo-Pacific from the east coast of South Africa to Seychelles, India, Ceylon, Indonesia, Solomon Islands and North Australia.

178. *Cephalopholis rogae* (Forskål)

Perca rogae Forskål, Descript. Animal., p. 38, 1775.

Aethaloperca rogae Munro, Fishes of Ceylon, p. 110, pl. 18, fig. 290, 1955. Smith, Fishes of Seychelles, p. 15, pl. 12, A, 1963.

Cephalopholis rogae Smith, Fishes of Southern Africa, p. 191, fig. 420, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/132).

Epinephelus rogae Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 24, 1931.

Specimens studied: Agathi (1), 275 mm. Ameni (1), 220 mm. Bitra (1), 225 mm. Minicoy (1), 228 mm.

D. IX, 18; A. III, 9; P. ii, 17-18; V. I, 5. Llat. 98-115; Ltr. 14-15+43-45.

Head 2.5-2.7 in standard length, 3.2-3.5 in total length. Depth of body 2.25-2.40 in standard length, 2.75-3.00 in total length. Eye 6.2-6.8 in head, 1.8-2.0 in snout and 1.0-1.2 in interorbital space. Maxillary reaching to below hind border of eye. Outer row of teeth conical in both jaws with a pair of moderate canines in front, inner rows of teeth depressible. Vomer and palatines with bands of smaller teeth. Preopercle finely serrated. Middle opercular spine nearer to the lower than to the upper. Pectoral as long as postorbital part of head plus half eye diameter. Ventral equal to or slightly longer than pectoral. Soft dorsal and anal angulate. Caudal truncate. Colour: Uniformly dark brown to blackish including fins; a broad black bar from middle of sides to just before vent. Caudal and often soft dorsal narrowly edged with white.

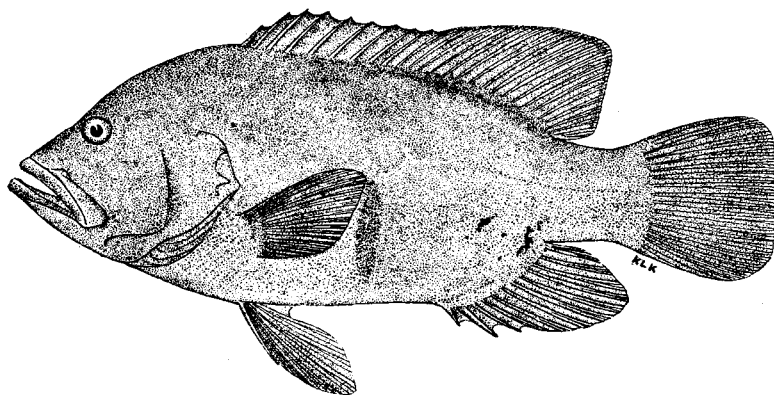


FIG. 178. *Cephalopholis rogaa* (Forsk.), 275 mm.

Local names: *Kalugini* (Minicoy). *Karuthachemmali* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, Ceylon, Indonesia, Palau Islands and eastwards to Solomon Islands.

179. *Cephalopholis sonnerati* (Valenciennes)

Serranus sonnerati Cuvier and Valenciennes, Hist. Nat. Poissons, 2, p. 299, 1828.

Cephalopholis sonnerati Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Smith and Smith, Fishes of Seychelles, p. 15, pl. 12, H, 1963. Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/133).

Enneacentrus sonnerati Munro, Fishes of Ceylon, p. 11, pl. 18, fig. 295, 1955.

Epinephelus sonnerati Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 25, 1931.

Serranus sonnerati Day, Fishes of India, p. 25, pl. 7, fig. 1, 1878.

Specimens studied: Agathi (1), 129 mm. Chetlat (1), 120 mm. Kavarathi (2), 168 and 325 mm. Minicoy (4), 132 to 145 mm.

D. IX, 14-15; A. III, 9; P. i. 17; V. I, 5. Llat. 105-116; Ltr. 12-16+1+30-39.

Head 2.5-2.7 in standard length, 3.1-3.5 in total length. Depth of body 2.6-2.9 in standard length, 3.3-3.7 in total length. Eye 5.4-6.2 in head, 1.3-1.6 in snout and about 0.8-1.0 in interorbital space. Broad band of depressible teeth; canines in outer row at symphysis moderate. Maxillary reaching a level beyond hind border of eye. Preopercle margin finely serrated. A pair of moderate canines anteriorly in each jaw. Pectoral equal to or a little longer than postorbital length of head. Ventral $\frac{1}{2}$ eye diameter shorter than postorbital part of head. Colour: Reddish brown; head darker than body. Head and anterior part of body often with bluish reticulations and small pale spots. Fins brown, bordered darker.

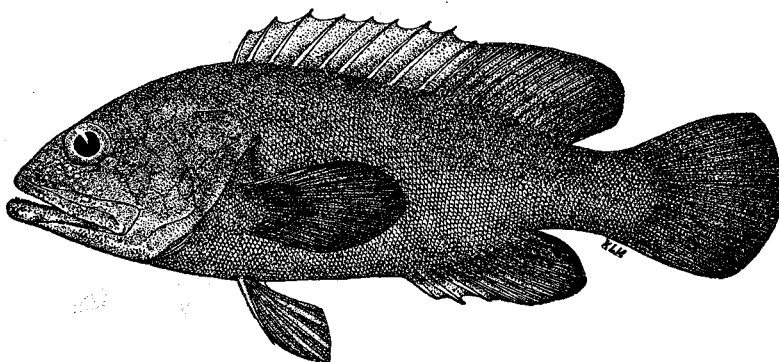


FIG. 179. *Cephalopholis sonnerati* (Valenciennes), 132 mm.

Local names: *Ryfana* (Minicoy). *Chencheerachammam*, *Choppuchammam* (other islands).

Distribution: From the east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Okinawa, south to Australia, east to Caroline and Samoan Islands.

180. *Cephalopholis argus* Bloch and Schneider

Cephalopholis argus Bloch and Schneider, Syst. Ichth., p. 311, pl. 61, 1801. Munro, Fishes of Ceylon, p. 110, pl. 18, fig. 292, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Smith and Smith, Fishes of Seychelles, p. 15, pl. 12, D, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/134).

Epinephelus argus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 28, 1931.

Serranus guttatus Day, Fishes of India, p. 24, pl. 6, fig. 3, 1878.

Specimens studied: Agathi (1), 147 mm. Bitra (1), 254 mm. Chetlat (9), 56 to 150 mm. Kalpeni (7), 42 to 98 mm. Kadamat (1), 67 mm. Kiltan (3), 82 to 98 mm. Kavarathi (1), 150 mm. Minicoy (19), 35 to 228 mm.

D. IX, 15-16; A. III, 8-9; P. i, 16-17; V. I, 5. Llat. 95-108; Ltr. 13-15 + 1 + 34-38.

Head 2.4-2.6 in standard length, 3.0-3.2 in total length. Depth of body 2.8-3.1 in standard length, 3.6-3.8 in total length. Eye 5.7-6.5 in head, about 1.5-1.7 in snout and equal to interorbital space. Maxillary reaching far posterior to a level from hind border of eye. Posterior dorsal spines subequal, shorter than twice diameter of eye. Second anal spine slightly longer than third. Pectoral equal to or shorter than postorbital length of head. Ventral shorter than half length of head. Colour: Background colour variably uniform bluish brown, head and body with bluish dark edged spots. Fins dark brown with spots as on body; soft dorsal, anal, caudal and pectoral with narrow white margin. A few specimens with 5-7 dark transverse bands narrower than interspaces on body.

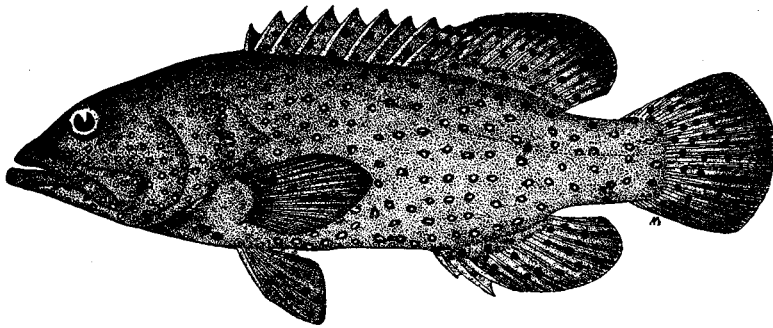


FIG. 180. *Cephalopholis argus* Bloch and Schneider, 185 mm.

Local names: *Bulufana* (Minicoy). *Neelachammam* (other islands).

Distribution: East Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, North Australia and New Hebrides, Samoan, Society, Hawaiian and Tuamotu Islands.

181. *Cephalopholis miniatus* (Forsk.)

Perca miniata Forsk., Descript. Animal., p. 41, 1775.

Cephalopholis miniatus Smith and Smith, Fishes of Seychelles, p. 15, pl. 12, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/135).

Enneacentrus miniatus Munro, Fishes of Ceylon, p. 110, pl. 18, fig. 294, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959.

Epinephelus miniatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 30, 1931.

Serranus miniatus Day, Fishes of India, p. 24, pl. 6, fig. 2, 1878.

Specimens studied: Bitra (2), 250 and 265 mm. Minicoy (2), 132 and 166 mm.

D. IX, 15; A. III, 9; P. i, 17; V. I, 5. Llat. 98-113; Ltr. 13-16+1+29-38.

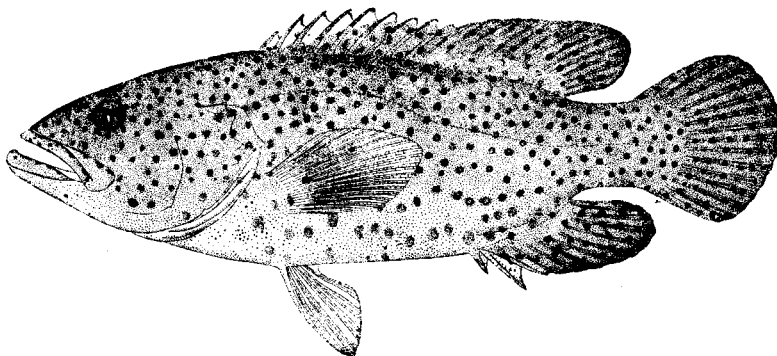


FIG. 181. *Cephalopholis miniatus* (Forskål), 265 mm.

Head 2.5-2.7 in standard length, 3.1-3.3 in total length. Depth of body 2.8-3.0 in standard length, 3.5-3.7 in total length. Eye 5.5-6.2 in head, 1.4-1.6 in snout and about 0.8-1.1 in interorbital space. Maxillary reaching to below hind margin of eye or a little beyond. Teeth depressible in narrow bands, outer row of teeth strong and short, a pair of small canines in front of each jaw. Hind margin of preopercle finely serrated. Sixth or seventh dorsal spine longest, about twice eye diameter. Second anal spine little longer than third, equal to longest dorsal spine. Pectoral equal to postorbital part of head plus half eye diameter. Ventral shorter than pectoral by one eye diameter. Colour: Uniform reddish brown; head and body excepting chest and abdomen and median fins with bluish spots edged darker. Dorsal and anal edged dusky. Pectoral pale with two or three spots basally. Ventral dusky, outer edge of first ray dark.

Local names: *Sikkifana* (Minicoy). *Chencheerachammam* (Bitra).

Distribution: The Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, New Britain, Solomon Islands and Samoa.

182. *Epinephelus flavocaeruleus* (Lacépède)

Holocentrus flavocaeruleus Lacépède, Hist. Nat. Poissons, 4, p. 367, 1802.

Epinephelus flavocaeruleus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 35, 1931. Smith, Fishes of Southern Africa, p. 195, pl. 17, fig. 433, 1949. Munro, Fishes of Ceylon, p. 112, pl. 19, fig. 301, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/136).

Serranus flavocaeruleus Day, Fishes of India, p. 15, pl. 3, fig. 1, 1878.

Specimen studied: Thinnakara (Bangaram) (1), 239 mm.

D. XI, 17; A. III, 8; P. i, 17; V. I, 5. Llat. 118; Ltr. 17+1+57.

Head 2.6 in standard length, 3.3 in total length. Depth of body 2.5 in standard length, 3.2 in total length. Eye 5.3 in head, 1.4 in snout and a little less than interorbital space. Maxillary reaching to below hind border of eye. Teeth in narrow bands, depressible, fixed teeth of outer row short and strong. Preopercle coarsely serrated, serrae at angle enlarged. Fourth or fifth dorsal spine longest, twice diameter of eye. Third anal spine a little longer than second, about $1\frac{1}{2}$ eye diameter. Pectoral and ventral subequal, about postorbital part of head. Colour: Head and body dark purplish blue; tip of snout, maxillary, caudal peduncle and fins yellowish. Tip of ventral black, tips of median rays of anal dark, base of dorsal and anal violet.

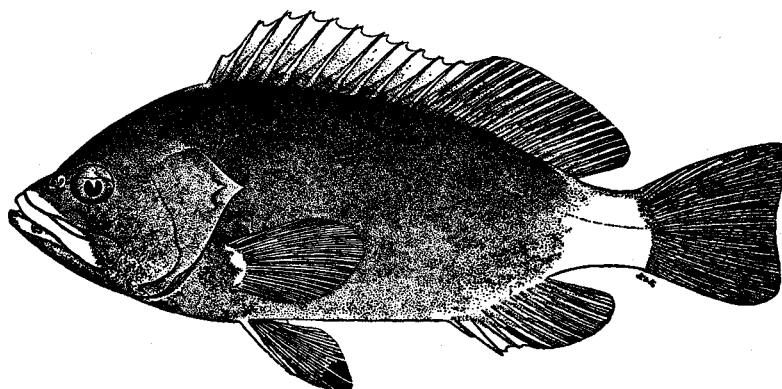


FIG. 182. *Epinephelus flavocaeruleus* (Lacépède), 239 mm.

Local name: *Chammam* (Thinnakara).

Distribution: East coast of Africa to the coasts of India, Laccadives, Ceylon, Indonesia, Philippines, China, Taiwan, Gilbert Islands and Australia.

183. *Epinephelus morrhua* (Valenciennes)

Serranus morrhua Valenciennes, Hist. Nat. Poissons, 9, p. 434, 1833. Day, Fishes of India, p. 21, pl. 5, fig. 1, 1878.

Epinephelus morrhua Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 42, 1931. Smith, Fishes of Southern Africa, p. 196, pl. 18, fig. 438, 1949. Munro, Fishes of Ceylon, p. 112, pl. 19, fig. 302, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/137).

Specimen studied: Minicoy (1), 175 mm.

D. XI, 16; A. III, 8; P. i, 17; V. I, 5. Llat. 102; Ltr. 15+1+34.

Head 2.6 in standard length, 3.1 in total length. Depth of body 3 in standard length, 3.7 in total length. Eye 5.2 in length of head, 1.1 in snout and about $\frac{2}{3}$ in interorbital space. Maxillary reaching to below hind border of eye. Narrow bands of teeth in jaws, outer fixed teeth including symphysial canines strong. Preopercle serrated behind, serrations at angle enlarged. Third dorsal spine longest, last spine only slightly shorter. Pectoral slightly shorter than postorbital length of head, ventral shorter. Colour: Brown with large irregular white patches on body. Two dark stripes from eye to border of operculum. Maxillary groove edged dark above. Vertical fins brownish, tips of membrane of spinous dorsal darker. Pectoral and ventral light brownish.

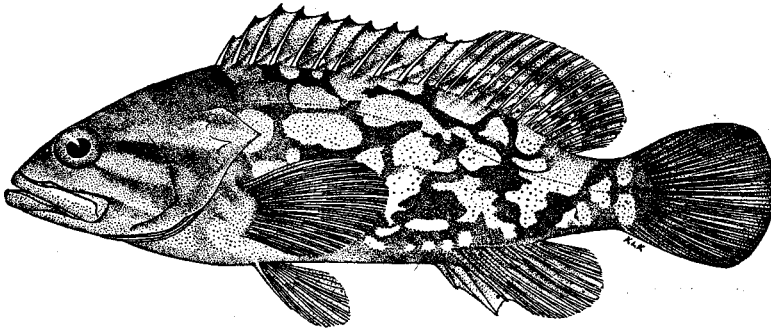


FIG. 183. *Epinephelus morrhua* (Valenciennes), 175 mm.

Local name: *Lagganfana* (Minicoy).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines and Japan.

Note: We have but a single specimen described above which is considered to be a colour variety of *E. morrhua* (Valenciennes).

184. *Epinephelus corallicola* (Valenciennes)

Serranus corallicola Cuvier and Valenciennes, Hist. Nat. Poissons, 2, p. 336, 1828. Day, Fishes of India, p. 20, 1878.

Epinephelus corallicola Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 52, 1931 (in part). Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/138).

Epinephelus macrospilos Smith, Fishes of Southern Africa, p. 506, pl. 19, fig. 440 a, 1949 (not of Bleeker).

Specimens studied: Agathi (2), 155 and 172 mm. Ameni (4), 27 to 120 mm. Chetlat (1), 175 mm. Kavarathi (2), 92 and 125 mm. Kiltan (1), 215 mm. Minicoy (3), 106 to 265 mm. Suheli (1), 99 mm.

D. XI, 16; A. III, 8; P. i, 17; V. I, 5. Llat. 88-115; Ltr. 14-17 + 1 + 35-39.

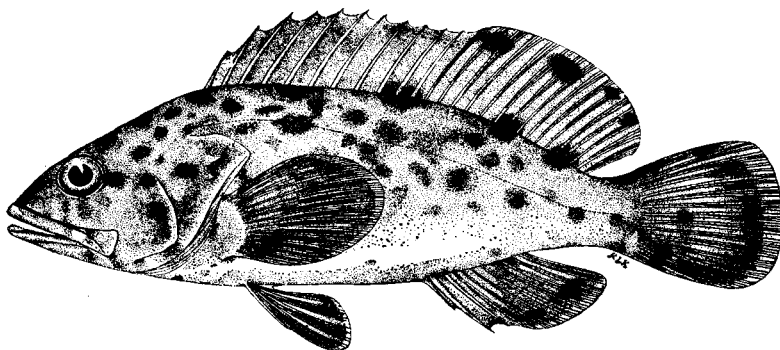


FIG. 184. *Epinephelus corallicola* (Valenciennes), 98 mm.

Head 2.4-2.6 in standard length, 3.1-3.3 in total length. Depth of body 2.9-3.0 in standard length, 3.7-3.8 in total length. Eye 5.0-5.8 in head, less than snout and about 0.7 in interorbital space. Broad bands of depressible teeth in jaws; outer row of fixed teeth small with moderate canines anteriorly. Maxillary reaching to below hind border of eye. Hind edge of preopercle finely serrated. Pectoral equal to or a little longer than postorbital part of head. Ventral $\frac{3}{4}$ eye diameter shorter than pectoral. Colour: Generally brownish, paler below. Head and body with dusky brown blotches of which a row below the lateral line and four or five blotches along the back at the base of dorsal darker. Dorsal, anal and caudal brownish with large blotches, those on dorsal and anal becoming confluent in large specimens. Pectoral and ventral brown. All fins with narrow white margin.

Local names: *Goudarufana* (Minicoy). *Poochachammam* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, North Australia, Caroline Islands, Samoa and Tuamotu Islands.

185. *Epinephelus fasciatus* (Forskål)

Perca fasciata Forskål, Descript. Animal., pp. 11 and 40, 1775.

Epinephelus fasciatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 58, 1931. Smith, Fishes of Southern Africa, p. 195, pl. 18, fig. 436, 1949. Munro, Fishes of Ceylon, p. 11, pl. 19, fig. 299, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/139).

Serranus fasciatus Day, Fishes of India, p. 15, pl. 3, fig. 2, 1878.

Specimens studied: Kiltan (4), 142 to 195 mm. Minicoy (2), 134 and 170 mm. Suheli (3), 160 to 185 mm.

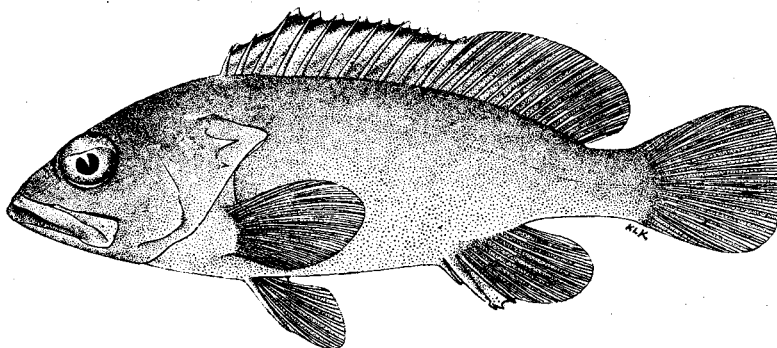


FIG. 185. *Epinephelus fasciatus* (Forskål), 170 mm.

D. XI, 16; A. III, 8; P. i, 17; V. I, 5. Llat. 92-98; Ltr. 12-13 + 1+35-39.

Head 2.5 in standard length, 3.0 in total length. Depth of body 3.0-3.1 in standard length, 3.7-3.8 in total length. Eye 4.4-4.5 in head, equal to snout and 0.7 in interorbital space. Maxillary reaching scarcely to below hind border of eye. Hind border of preopercle finely serrated. Third or fourth dorsal spine longest, equal to $1\frac{1}{2}$ diameter of eye or longer. Second and third anal spines subequal, about equal to longest dorsal spine. Pectoral $\frac{1}{2}$ eye diameter longer than ventral and about equal to postorbital length of head. Colour: Yellowish brown. The eye is margined with dark brown except anteriorly; premaxillary groove with a brown streak above. Fins yellowish or similar to the general body colour. Membrane of spinous dorsal with black near margin and tipped with white. Six somewhat dark transverse bands present in young which fade on preservation.

Local names: *Ryfana* (Minicoy). *Chammam* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Ryukyu Islands, China, Japan, Queensland and eastwards to the Marquesas Islands.

186. *Epinephelus tauvina* (Forskål)

Perca tauvina Forskål, Descript. Animal., p. 39, 1775.

Epinephelus tauvina Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 60, fig. 7, 1931 (Synonymy in part). Smith, Fishes of Southern Africa, p. 197, pl. 19, fig. 447 and text fig. 447, 1949. Munro, Fishes of Ceylon, p. 114, pl. 19, fig. 310, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMF RI-LA-F. 115/140).

Serranus salmoides Day, Fishes of India, p. 20, pl. 4, fig. 3, 1878.

Serranus stoliczkae Day, Fishes of India, p. 11, pl. I, fig. 3, 1878.

Specimen studied: Kavarathi (1), 120 mm.

D. XI, 15; A. III, 8; P. i, 17; V. I, 5. Llat. 102; Ltr. 13+1+37.

Head 2.5 in standard length, 3.1 in total length. Depth of body 3.2 in standard length, 3.9 in total length. Eye 5.6 in head, 1.3 in snout and about 0.8 in interorbital space. Maxillary reaching to below the hind border of eye. Teeth in narrow bands in jaws, canines near symphysis short. Preopercle serrated behind, serrations at angle enlarged. Opercular spines equidistant. Pectoral as long as postorbital length of head. Colour: Brown, with indistinct dark broad cross bars and brown spots on head, body and median fins. Pectoral with a few spots. Ventral brownish distally.

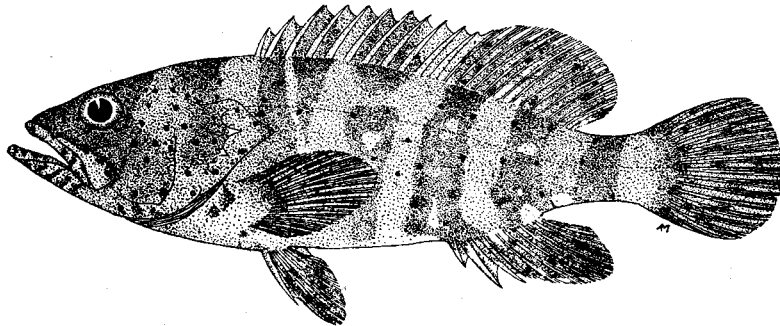


FIG. 186. *Epinephelus tauvina* (Forskål), 120 mm.

Local name: *Chammam* (Kavarathi).

Distribution: Widespread from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Japan, Australia and Caroline, Ellice and Hawaiian Islands.

Note: Left ventral fin has only 4 rays in the specimen examined.

187. *Epinephelus fuscoguttatus* (Forskål)

Perca summana var. *fuscoguttata* Forskål, Descript. Animal., p. 42, 1775.

Epinephelus fuscoguttatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 68, 1931. Smith, Fishes of Southern Africa, p. 198, pl. 19, fig. 451, 1949. Munro, Fishes of Ceylon, p. 114, pl. 19, fig. 309, 1955. Smith and Smith, Fishes of Seychelles, p. 15, pl. 14, B, G, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/141).

Serranus fuscoguttatus Day, Fishes of India, p. 22, pl. 5, fig. 3, 1878.

Specimens studied: Agathi (1), 375 mm. Kavarathi (1), 240 mm. Kiltan (1), 212 mm. Minicoy (15), 54 to 310 mm.

D. XI, 14-15; A. III, 8; P. ii, 16-17; V. I, 5. Llat. 110-118; Ltr. 15-18+1+43-46.

Head 2.3-2.5 in standard length, 2.8-3.0 in total length. Depth of body 2.8-3.0 in standard length, 3.4-3.6 in total length. Eye 5.8-6.6 in head, 1.1-1.3 in snout and 0.8-1.0 in interorbital space. Mouth oblique, maxillary reaching far beyond level of hind border of eye. Several rows of depressible teeth in jaws. Teeth present on vomer and palatines. Hind border of preopercle serrated with a shallow emargination above the rounded angle. Three opercular spines, the middle one nearer to the lower than to the upper. Third or fourth dorsal spine

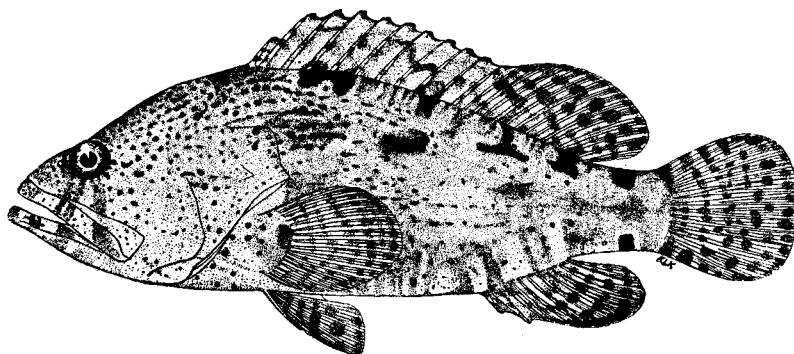


FIG. 187. *Epinephelus fuscoguttatus* (Forskål), 212 mm.

longest, twice eye diameter. Last dorsal spine 1.6 eye diameter. Pectoral equal to or slightly longer than half length of head and shorter than postorbital length of head. Ventral shorter than pectoral. Colour: Yellowish grey to brownish with dark brown spots on head and body, those on head smaller and closer. Three brown bars across jaws. Five large irregular dark brown blotches on nape and back and brown blotches in a series along the side of body and another black blotch on back of caudal peduncle. These blotches may be indistinct in large adults. Fins yellowish grey to brownish with dark brown spots.

Local names: *Fana* (Minicoy). *Chammam* (other islands).

Distribution: Widely distributed from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Taiwan, Australia, Marshall Islands and Tuamotu Islands.

188. *Epinephelus hexagonatus* (Bloch and Schneider)

Holocentrus hexagonatus Bloch and Schneider, Syst. Ichth., p. 323, 1801.

Epinephelus hexagonatus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/142).

Epinephelus merra Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 64, 1931 (not of Bloch, synonymy in part).

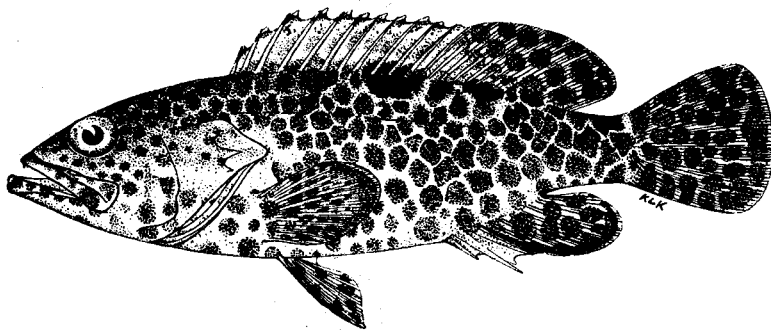


FIG. 188. *Epinephelus hexagonatus* (Bloch and Schneider), 138 mm.

Specimens studied: Agathi (1), 143 mm. Ameni (2), 147 and 180 mm. Bitra (16), 58 to 110 mm. Kalpeni (14), 100 to 205 mm. Kavarathi (5), 140 to 145 mm. Kiltan (7), 112 to 122 mm. Minicoy (9), 143 to 245 mm.

D. XI, 15-16; A. III, 8; P. i, 17; V. I, 5. Llat. 93-98; Ltr. 11-12 + 1 + 29-34.

Head 2.4-2.6 in standard length, 3.0-3.2 in total length. Depth of body 3.1-3.5 in standard length, 3.8-4.3 in total length. Eye 4.8-5.2 in head, a little shorter than snout and about 0.6-0.7 in interorbital space. Maxillary reaching to or a little beyond a level from the hind border of eye. Depressible rows of teeth in jaws, the inner row longer, outer fixed teeth moderate with canines near symphysis. Preopercular border slightly serrated behind. Middle opercular spine nearer to the lower than to the upper. Fourth or fifth dorsal spine longest, about 1/2 in postorbital length of head. Second anal spine equal to or slightly longer than third. Pectoral slightly shorter than postorbital part of head, ventral half eye diameter shorter than pectoral. Colour: Pale whitish, head and body with hexagonal brown spots separated by narrow white interspaces. Five blackish blotches along back, two along base of spinous dorsal, two along base of soft dorsal and one on upper side of caudal peduncle. A few hexagonal spots below the dorsal blotches often darker than others. Brown spots on all fins, outer margin of fins white. Tip of membranes of spinous dorsal white, blackish immediately below.

Local names: *Sikkisikkifana* (Minicoy). *Pullichammam* (other islands).

Distribution: Laccadives and coasts of India, Indonesia, Philippines, Marianas, Marshall, Fiji and Samoan Islands.

189. *Epinephelus caeruleopunctatus* (Bloch)

Holocentrus caeruleopunctatus Bloch, Naturges. Ausländ. Fische, 4, p. 94, pl. 242, fig. 2, 1790.

Epinephelus caeruleopunctatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 66, 1931. Munro, Fishes of Ceylon, p. 113, pl. 19, fig. 308, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/143).

Serranus tumilabris Day, Fishes of India, p. 16, pl. 3, fig. 2, 1878. (not of Cuvier and Valenciennes).

Specimens studied: Agathi (1), 144 mm. Ameni (1), 150 mm. Chetlat (3), 50 to 152 mm. Kalpeni (4), 125 to 176 mm. Kiltan (5), 47 to 140 mm. Minicoy (1), 132 mm.

D. XI, 16; A. III, 8; P. i, 17; V. I, 5. Llat. 95-103; Ltr. 12-15 + 1+33-36.

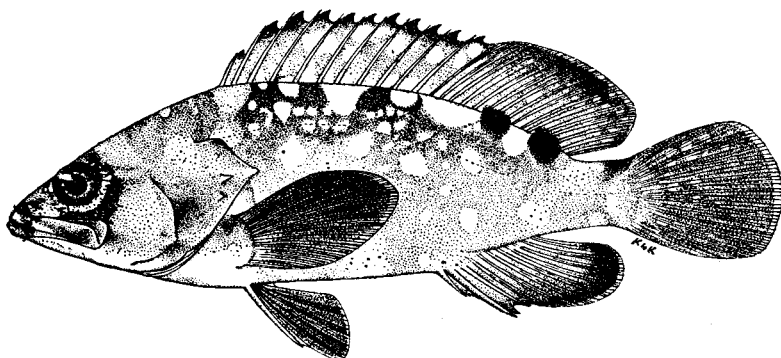


FIG. 189. *Epinephelus caeruleopunctatus* (Bloch), 105 mm.

Head 2.4-2.5 in standard length, 3.0-3.1 in total length. Depth of body 2.9-3.0 in standard length, 3.6-3.7 in total length. Eye 5.0-5.2 in head, 1.1-1.2 in snout and 0.6-0.7 in somewhat flat interorbital space. Maxillary reaching to below hind border of eye. Hind border of preopercle finely serrated. Third or fourth dorsal spine longest, equal to $1\frac{1}{2}$ diameter of eye. Second anal spine a little longer than third, slightly shorter than longest dorsal spine. Pectoral equal to or a little longer than postorbital part of head. Ventral shorter than pectoral by $\frac{1}{4}$ eye diameter. Colour: Brown with white patches on sides of body, dorsal and basal and upper part of caudal. 3-4 dark blotches on back. A black

streak in maxillary groove above. Fins brownish becoming darker distally and with narrow white margin except for spinous dorsal.

Local names: *Fana* (Minicoy). *Chammam* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Philippines, Japan and Caroline, Marshall, Solomon and Fiji Islands.

190. *Epinephelus fario* (Thunberg)

Perca fario Thunberg, Kongl. Vet. Akad. Nya Handlingar, 4, p. 296, pl. 9, 1772.

Epinephelus fario Munro, Fishes of Ceylon, p. 111, 1955. Smith and Smith, Fishes of Seychelles, p. 15, pl. 13, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/144).

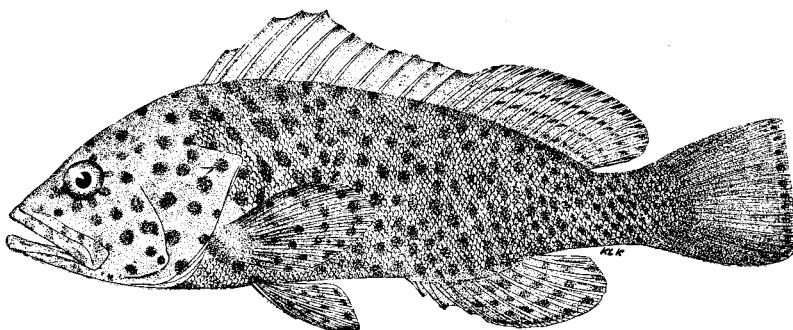


FIG. 190. *Epinephelus fario* (Thunberg), 265 mm.

Specimens studied: Bitra (1), 265 mm.

D. XI, 17; A. III, 8; P. ii, 16; V. I, 5. Llat. 115; Ltr. 16+1+46.

Head 2.6 in standard length, 3.3 in total length. Depth of body 3 in standard length, 3.8 in total length. Eye 5.8 in head, 1.3 in snout and about 0.9 in interorbital space. Maxillary reaching to below hind border of eye. Upper jaw with slender teeth in several series, wider and longer anteriorly, inner rows of teeth depressible, a pair of canines in front; lower jaw with three or four rows of depressible teeth and a pair of short canines in front. Bands of smaller teeth on vomer and palatines. Hind margin of preopercle finely serrated. Pectoral equal to or slightly shorter than postorbital part of head, ventral slightly shorter than half length of head. Third and fourth dorsal spine longest, equal to snout and eye together. Colour: Brown, slightly paler below with several blackish spots on head and body. Dorsal brownish with dark markings. Anal and ventral light brownish with brown spots. Pectoral light brownish with dark spots. Caudal brownish with indistinct dark spots.

Local name: *Fullichammam* (Bitra).

Distribution: East coast of Africa to the Laccadives, Ceylon, Indonesia, Philippines, China and Japan.

191. *Epinephelus merra* Bloch

Epinephelus merra Bloch, Naturges. Ausl nd. Fische, 7, p. 17, pl. 329, 1793. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 64, 1931 (in part). Smith, Fishes of Southern Africa, p. 196, pl. 18, fig. 439, 1949. Munro, Fishes of Ceylon, p. 113, pl. 19, fig. 307, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 115/145).

Serranus hexagonatus Day, Fishes of India, p. 14, pl. 2, fig. 3, 1878 (not of Bloch and Schneider, in part).

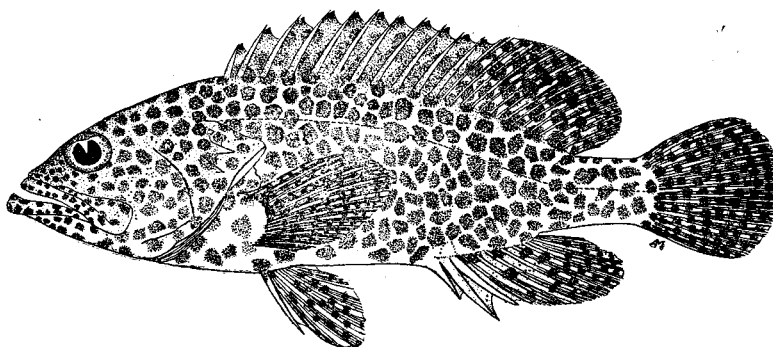


FIG. 191. *Epinephelus merra* Bloch, 150 mm.

Specimens studied: Agathi (3), 118 to 164 mm. Androth (2), 99 and 173 mm. Chetlat (15), 100 to 145 mm. Kadamat (2), 104 and 109 mm. Kalpeni (1), 32 mm. Kavarathi (5), 140 to 145 mm. Minicoy (10), 46 to 182 mm. Bangaram (2), 84 and 162 mm.

D. XI, 15-17; A. III, 8; P. i, 16; V. I, 5. Llat. 95-108; Ltr. 11-13 + 1+30-34.

Head 2.4-2.7 in standard length, 2.9-3.3 in total length. Depth of body 3.0-3.2 in standard length, 3.7-3.9 in total length. Eye 4.6-5.2 in head, equal to or a little shorter than snout and about 2/3 in interorbital space. Maxillary reaching to below hind border of eye. Teeth in narrow bands, inner row longer than the outer fixed teeth, canines moderate. Preopercle serrated behind, the serrations at the angle larger. Fourth or fifth dorsal spine longest, about 1½ diameter of eye, last dorsal spine a little shorter. Soft dorsal rays longer than dorsal spines. Second anal spine slightly longer than third. Pectorals equal to or a

little longer than postorbital length of head. Ventral shorter. Colour: Light brownish or greyish with large hexagonal brown to dark spots with narrow light interspaces forming a honey-comb on head and body. Spots on fins and ventrally on sides more widely spread and somewhat round. Membrane at the tip of each dorsal spine with blackish spot.

Local names: *Sikkisikkifana* (Minicoy). *Fullichammam* (other islands).

Distribution: Widespread from the east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Japan, Queensland and Marianas, Marshall and Marquesas Islands.

192. *Epinephelus elongatus* Schultz

? *Serranus malabaricus* Day, Fishes of India, p1. 4, fig. 2, 1878 (not of Bloch and Schneider). *Epinephelus elongatus* Schultz, Bull. U.S. Nat. Mus., 202, 1, p. 345, fig. 53 and p1. 25 c, 1953. Jones, Bull. cent. mar. Fish. Res. 8, p. 10, 1969 (Cat. No. CMFRI-LA-F. 155/146).

Specimens studied: Agathi (1), 80 mm. Chetlat (4), 34 to 135 mm. Kalpeni (1), 56 mm. Minicoy (4), 139 to 182 mm.

D. XI, 14-15; A. III, 8; P. i, 18; V. I, 5. Llat. 96-105; Ltr. 11-13 + 1 + 29-34.

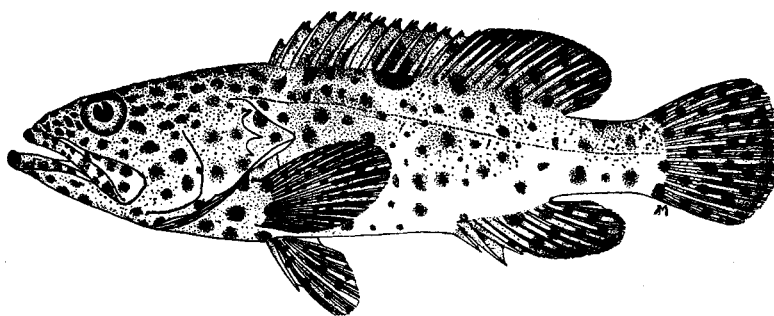


FIG. 192. *Epinephelus elongatus* Schultz, 155 mm.

Head 2.2-2.4 in standard length, 2.7-2.9 in total length. Depth of body 3.2-3.5 in standard length, 4.0-4.3 in total length. Eye 5.4-6.2 in head, 1.2-1.3 in snout and about 2/3 in interorbital space. Pectoral 2/3 eye diameter shorter than postorbital length of head. Maxillary reaching posterior to a vertical from the hind border of eye. Three or more rows of teeth in jaws; outer fixed row with a pair of canines in front. Fourth or fifth dorsal spine longest, soft dorsal rays a little longer than dorsal spines. Second anal spine stronger and slightly longer than third spine. Colour: Light brownish with dark brown spots much smaller than interspaces on head, body and fins. A blackish blotch below 8th

to 11th dorsal spines extending on to basal part of fin. Spots on outer surface of distal part of pectoral not clearly visible in large specimens. Pectoral, caudal and ventral with narrow white margin.

Local names: *Gaudarufana* (Minicoy). *Poochachammam* (other islands).

Distribution: Laccadives, Calcutta (India) and Marianas, Marshall and Samoan Islands.

193. *Epinephelus melanostigma* Schultz

Serranus merra var. *stellans* Fowler, Bull. U.S. Nat. Mus., 100, 10, p. 272, fig. 17, 1930. (not of Bloch and Schneider).

Epinephelus melanostigma Schultz, Bull. U.S. Nat. Mus., 202, 1, p. 348, fig. 54, 1953. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 286, fig. 2, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 115/147).

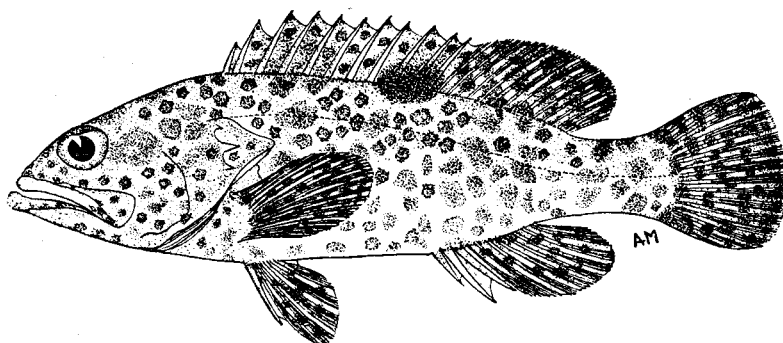


FIG. 193. *Epinephelus melanostigma* Schultz, 136 mm.
(after Jones and Kumaran)

Specimens studied: Ameni (1), 140 mm. Kalpeni (1), 64 mm. Kavarathi (3), 56 to 75 mm. Kiltan (3), 30 to 136 mm. Minicoy (5), 81 to 140 mm.

D. XI, 15; A. III, 8; P. ii, 17; V. I, 5. Llat. 90-95; Ltr. 10-12 + 1 + 28-34.

Head 2.4-2.6 in standard length, 2.9-3.1 in total length. Depth of body 3.2-3.4 in standard length, 4.0-4.5 in total length. Eye 4.9-5.2 in head, as long as snout and about 0.6 in interorbital space. Maxillary reaching beyond a level from the posterior border of eye. Edges of preopercle finely serrated. Fourth or fifth dorsal spine longest, a little longer than last spine. Second anal spine subequal to third, and about equal to longest dorsal spine. Pectoral slightly shorter than postorbital part of head. Colour: Light greenish brown with brown hexagonal spots on head and body separated by whitish interspaces. Spots on lower

sides somewhat round. A large black blotch below eighth to eleventh dorsal spines extending on basal half of fin. Dorsal and caudal fins with brown hexagonal spots. Pectoral, ventral and anal with brown spots; soft dorsal, soft anal, pectoral and caudal with narrow white margin.

Local names: *Sikkisikkifana* (Minicoy). *Fullichammam* (other islands).

Distribution: Laccadives in the Indian Ocean and Philippines, Marianas and Marshall Islands in the Pacific.

Family PSEUDOGRAMMIDAE

Oblong, head and body compressed. Gape of mouth wide, maxillary reaching behind eye. A few rows of small teeth in jaws and a patch of teeth on vomer and palatines. A flat spine superiorly on preoperculum. Dorsal long with seven strong but short spines and 19-23 branched rays. Anal with three strong spines and 15-21 branched rays. Six branchiostegals. Pseudobranchiae present. Scales small, ctenoid.

Only dorsal lateral line present. Brownish with reticulated pattern of dark brown bands. A dark brown blotch on opercle *Pseudogramma polyacanthus*
Dorsal and peduncular lateral line present. Light brown with scattered dark brown blotches on body. No dark brown blotch on opercle *Aporops allfreei*

194. *Pseudogramma polyacanthus* (Bleeker)

Pseudochromis polyacanthus Bleeker, Nat. Tijds. Ned.-Ind., **10**, p. 375, 1856.

Pseudogramma polyacanthus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **6**, p. 120, fig. 21, 1939. Smith and Smith, Fishes of Seychelles, p. 13, pl. 9, J, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, **8**, p. 170, fig. 9, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 11, 1969 (Cat. No. CMFRI-LA-F. 191/148).

Specimens studied: Kavarathi (11), 20 to 55 mm. Kiltan (1), 34 mm.

D. VII, 20; A. III, 16; P. 18; V. I, 5. Ll. 33; Ltr. 5+1+20.

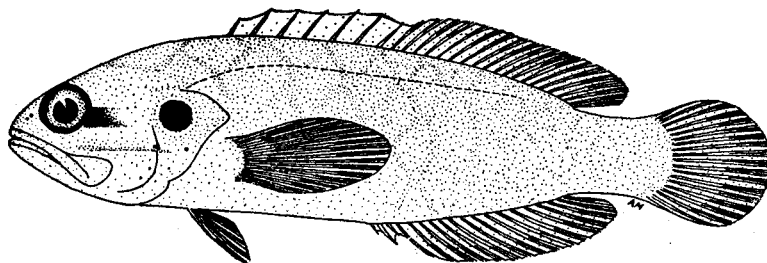


FIG. 194. *Pseudogramma polyacanthus* (Bleeker), 34 mm.
(after Jones and Kumaran)

Head 2.6-2.9 in standard length, 3.1-3.5 in total length. Depth of body 2.8-3.4 in standard length, 3.1-3.5 in total length. Eye 4.2-4.5 in head, 0.7 in snout and 0.3-0.4 in interorbital space. Mouth large, maxillary extending well beyond eye. A small spine at upper angle of preopercle. Teeth fine, in narrow bands in jaws, on vomer and palatines. Dorsal spines stout, fifth or sixth longest, lower than soft rays. Anal spines pungent, the second spine considerably longer than the other two. Pectoral slightly longer than postorbital part of head. Ventral insertion slightly in advance of pectoral base, its length about equal to snout and eye together. Scales on head, chest and nape cycloid; scales on posterior part of body ctenoid. About 50 scales in lateral series. A single lateral line ending below behind middle dorsal rays. Base of dorsal, anal and interorbital scaly. Colour: Brownish, scarcely lighter below. Large specimens with reticulated dark brown bands on sides of body, a dark brown blotch on opercle and a dark streak behind eye. Vertical fins somewhat dusky. Pectoral and ventral pale.

Distribution: East coast of Africa to the Laccadives, Indonesia, Philippines and Hawaiian, Fiji and Tahiti Islands.

195. *Aporops allfreei* Smith

Aporops allfreei Smith, Ann. Mag. Nat. Hist., (12), 6, p. 553, fig. 2, 1953. Smith and Smith, Fishes of Seychelles, p. 13, pl. 9, H, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 10, p. 323, fig. 3, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 191/154).

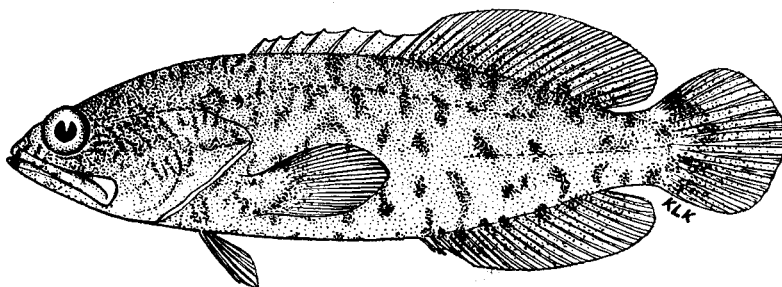


FIG. 195. *Aporops allfreei* Smith, 52 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (2), 52 and 60 mm.

D. VII, 22-23; A. III, 20-21; P. i, 16; V. I, 5. Ll. 40+30; Ltr. 7+1+28. GR. 4-5+1+5-6.

Head 2.6-2.7 in standard length, 3.2-3.3 in total length. Depth of body 3.5-3.7 in standard length, 4.3-4.5 in total length. Eye 4.8-5.0 in head, slightly more than snout and 0.4 in interorbital space. Mouth oblique, maxillary reaching far behind a vertical from the hind border of eye. Villiform band of teeth in

jaws, vomer and palatines. A flat spine at upper angle of preopercle. Upper margin of opercular membrane joined to the shoulder by a membraneous flap. Pectoral slightly shorter than head without snout. Ventral longer than half length of postorbital part of head. Scales very small, extending to basal part of fins. Dorsal lateral line reaching to below hind half of soft dorsal; hinder lateral line on mid axis of caudal peduncle, beginning over origin of anal. Soft dorsal rays about twice longer than third spine of dorsal. Colour: Light brown with several irregular dark brown blotches on body and dark brown markings on head. A dark brown line along anterior margin of eye. Fins brownish.

Distribution: Known only from Kisiti Island and Pemba in the Western Indian Ocean and Minicoy in the Laccadives.

Family PSEUDOCROMIDAE

Oblong, head and body compressed. Mouth moderate. Jaws with one or two series of teeth laterally and a patch of villiform teeth at symphysis of jaws, outer series of teeth sometimes caninoid. Vomer and palatines with a few teeth. Dorsal long, with two or three spines anteriorly. Scales large, ctenoid. Lateral line interrupted, its first part close to base of dorsal and ending below hind rays of dorsal and the hind part median beginning below hind rays of dorsal.

196. *Pseudochromis tapeinosoma* Bleeker

Pseudochromis tapeinosoma Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 115, 1853. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 169, fig. 8, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 112/149).

Pseudochromis (*Leptochromis*) *tapeinosoma* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 135, fig. 23, 1931.

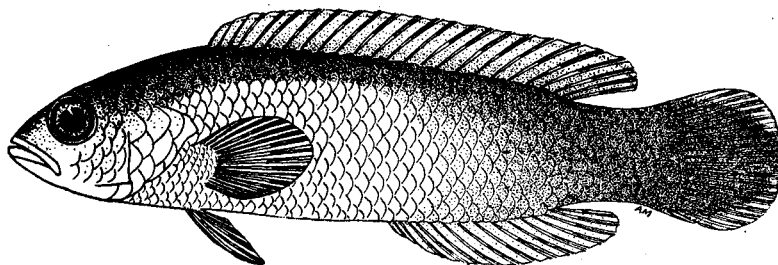


FIG. 196. *Pseudochromis tapeinosoma* Bleeker, 48 mm.
(after Jones and Kumaran)

Specimens studied: Kavarathi (19), 24 to 45 mm. Kiltan (6), 31 to 39 mm. Minicoy (11), 32 to 52 mm.

D. II-III, 21-23; A. II-III, 13-14; P. 17-18; V. I, 5. L1. 25-29+9-11;
Ltr. 2+1+11-12. GR. 4-5+1+7-9.

Head 3.3-3.6 in standard length, 4.0-4.3 in total length. Depth of body 3.5-3.7 in standard length, 4.2-4.5 in total length. Eye 3.3-3.6 in head, 0.6-0.7 in snout and 0.5-0.6 in interorbital space. Maxillary reaching to below anterior third of eye. Teeth in jaws minute; outer series conical, anteriorly 3-4 upper and 2-3 lower caninoid. Vomer and palatines with minute teeth. Pectoral shorter than head without snout. Ventral equal to or slightly longer than postorbital length of head. Scales ctenoid, 33-35 in lateral series. Preoperculum with 3 rows of scales. Upper lateral line running obliquely upwards and then parallel to the base of dorsal and terminating below 17th or 18th ray. Lower lateral line median. All rays of dorsal and anal branched. Colour: Head and body above and posteriorly dark brown in male with lower sides of head and body upto above middle of anal fin pale yellowish. Dorsal brownish; anal light brownish; caudal dark brown with outer edges yellowish; pectoral and ventral yellowish. Female light brownish on back, lighter below; fins pale yellowish.

Distribution: Laccadives and from Indonesia to the Philippines and Queensland.

Family PLESIOPIDAE

Oblong, compressed. Mouth slightly protractile, maxillary extending below eye or slightly behind; maxillary with a supplemental bone. Teeth minute or slightly enlarged in bands in jaws, vomer and palatines. Six branchiostegals. Pseudobranchiae present. Dorsal fin single, usually with XI-XII spines and 6-9 divided rays. Anal with three spines and 6-9 rays. Scales large, ctenoid, those on head smaller. Lateral line in two parts; the anterior part running close to base of dorsal and ending below soft dorsal and the hind part median beginning opposite last dorsal spines.

197. *Plesiops caeruleolineatus* Rüppell

Plesiops caeruleolineatus Rüppell, Neue Wirbelt., Fische Rothen Meeres, p. 5, pl. 2, fig. 5, 1835. Smith, Ann. Mag. Nat. Hist., (12), 5, p. 143, 1952. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 111/156).

Plesiops melas Bleeker, Verh. Bat. Gen., 22, Ichth. Fauna Bali, p. 9, 1849. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 378, fig. 91, 1929. Smith, Fishes of Southern Africa, p. 187, 1949.

Plesiops nigricans Day, Fishes of India, p. 128, pl. 31, fig. 5, 1878 (not of Rüppell). Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 375, 1929. (not of Rüppell; in part).

Specimens studied: Agathi (160), 24 to 62 mm. Ameni (85), 13 to 63 mm. Bitra (19), 38 to 69 mm. Kadamat (138), 18 to 59 mm. Kavarathi (190), 24 to 60 mm. Kiltan (126), 32 to 64 mm. Minicoy (132), 23 to 65 mm.

D. XI (XII), 7 (8); A. III, 7-8; P. 20-22; V. I, 4. Ll. 17-20+10-14; Ltr. 2+1+9-10. GR. 3-4+1+8-9.

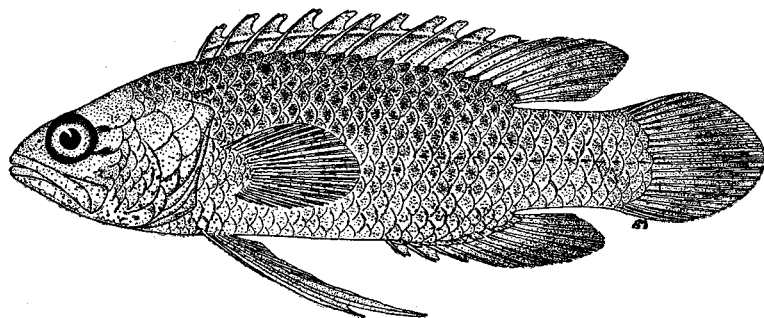


FIG. 197. *Plesiops caeruleolineatus* Rüppell, 62 mm.

Head 2.7-3.0 in standard length, 3.5-3.9 in total length. Depth of body 2.8-3.4 in standard length, 3.6-4.4 in total length. Eye 3.5-4.2 in head, 0.6-0.7 in snout and 0.5-0.6 in interorbital space. Dorsal profile of head almost uniformly convex. Maxillary reaching to behind eye, 1.8-2.0 in head. Preoperculum with 3-4 series of scales. Dorsal spines increasing in length gradually to the last; membrane between spines deeply incised. Third anal spine longest. Pectoral about $\frac{1}{3}$ eye longer than postorbital length of head; 6-8 lower rays with silk-like filaments. Ventral longer than head, the first ray reaching behind origin of anal. Lateral line slightly arched anteriorly and running close to base of dorsal and terminating below hind rays. Lower lateral line median and beginning opposite last dorsal spines. Teeth in jaws villiform, those at symphysis enlarged; teeth villiform on vomer and palatines. Preoperculum rounded. Colour: Variable, generally dark brown to blackish with ventral part of head and belly lighter to slightly bluish. Scales on sides with a blackish blue spot. Spinous dorsal with a hyaline to bluish band, distal part of spinous dorsal and of anterior soft rays pale with a lighter submarginal stripe; rest of the fin dark. Anal with a bluish basal band; anterior half of the fin sometimes narrowly edged white; rest of the fin dark. Caudal dark brown, often with a vertical lighter band at base and a submarginal lighter band. Pectoral pale to brownish. Ventral brownish; basal half of soft rays often with dark spots.

Local names: *Kalumas* (Minicoy). *Kakkathilathi* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, China, Japan, Australia and Samoan, Friendly and Kingsmill Islands.

Family ANTHIIDAE

Oblong, more or less compressed. Mouth moderate, protractile; maxillary without a supplemental bone. Preoperculum usually serrated; operculum with two or three short spines. Jaws with small teeth, outer series enlarged and with some canines. Teeth present on vomer and palatines, and sometimes on tongue. Dorsal fin single with anterior spinous portion equal to or somewhat longer or shorter than the soft portion. Six or seven branchiostegals. Gill membranes separate, free from isthmus. Scales moderate, ctenoid or smooth. Lateral line complete.

1. Six or seven scales between base of dorsal and lateral line. Depth 3.0-3.2 in length. Deep pink becoming golden to yellowish below. Dorsal spines and 3-4 anterior rays of dorsal pink, rest of the fin yellowish. Caudal golden, hind margin broadly yellowish. *Anthias cooperi*
Three scales between base of dorsal and lateral line 2
2. Scales of lateral line with squamulae at their base. Third dorsal spine produced into a filament. Yellowish with reddish tinge; a broad light band edged grey from eye to pectoral base; posterior rays of dorsal and anal and median rays of caudal with dusky markings .. *Anthias squamipinnis*
Lateral line scales without squamulae at their base. Third dorsal spine not produced. Reddish with greenish tinge above, becoming yellowish below. Fins yellowish hyaline *Anthias cichlops*

198. *Anthias cooperi* Regan

Anthias cooperi Regan, Fauna and Geography of the Maldive and Laccadive Archipelagoes, **1**, p. 273, 1903. Trans. Linn. Soc. London, **12**, pl. 24, fig. 4, 1908. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 11, 1969 (Cat. No. CMFRI-LA-F. 175/150).
Anthias cichlops Jones, Proc. Symposium on Scombroid Fishes, p. 653, fig. 14, 1962 (not of Bleeker).

Specimens studied: Minicoy (63), 31 to 59 mm.

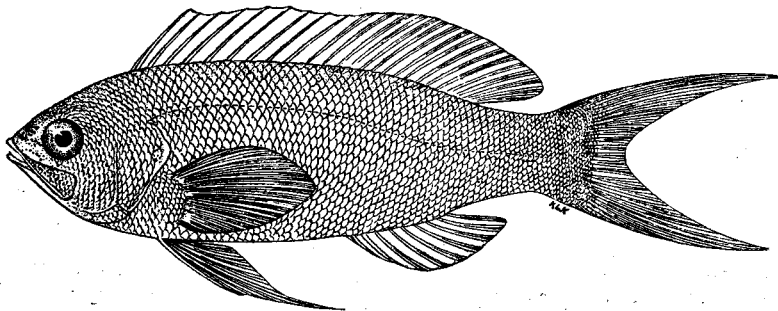


FIG. 198. *Anthias cooperi* Regan, 59 mm.

D. X, 16-17; A. III, 7; P. ii, 17; V. I, 5. Ll. 52-56; Ltr. 6-7 + 1 + 18-20. GR. 9-10 + 1 + 22-24.

Body compressed, elongate oval, dorsal profile slightly convex at nape. Head 3.1-3.3 in standard length, 4.3-4.8 in total length. Depth of body 3.0-3.2 in standard length, 4.2-4.6 in total length. Eye 3.5-4.1 in head, 0.8-1.0 in snout and 1.0-1.1 in convex interorbital space. Nostrils close together, the hinder open, the anterior with an elevated posterior rim. Hind border of preopercle with 13-18 serrae, the one at angle scarcely larger than others; lower margin smooth. Subopercle and interopercle smooth. 3 spines on opercle, the upper a blunt point hidden by scales, the middle one longer than the lower. Mouth when closed being overhung by the pointed and well developed anterior part of upper lip. Mouth oblique, maxilla reaching to below about hind border of eye. In upper jaw an outer series of fine sharp teeth with a projecting canine on each side near symphysis and an inner row of minute teeth with an inwardly curved canine on each side in front. In lower jaw uniserial sharp teeth with a recurved canine on side and an outwardly flaring canine in front on each side. Triangular patch of teeth on vomer and a narrow band of teeth on palatines. Dorsal origin slightly behind a level from the hind margin of preopercle. Dorsal spines flexible, 1st spine shortest, slightly longer than eye diameter, 2nd spine 1.6-2.5 in head and slightly longer than 3rd, posterior spines subequal, equal to or slightly longer than 2nd spine, rays equal to dorsal spines. 1st anal spine minute, 3rd spine longer than 2nd, anal rays equal to or slightly shorter than those of dorsal. Pectoral equal to or slightly shorter than head, median rays longest. Ventral equal to or shorter than head in juveniles; 2nd ray produced in adults, 1.2-1.6 times length of head. Caudal deeply lunate, lobes pointed and increasing in length with age. Scales ctenoid. Cheeks and maxillary scaled. Soft dorsal and anal with a low basal scaly sheath. Base of caudal and pectoral scaly. Lateral line complete, gently curved more or less following dorsal profile. Colour: Upper sides of head and back deep pink becoming golden to yellowish on lower sides. Dorsal spines and anterior 3-4 rays of dorsal pink, base of rest of dorsal rays yellowish, this colour increasing in breadth posteriorly and extending to the tip of last rays. Anal and pectoral yellowish. Anterior margin of ventral golden, rest of the fin yellowish. Caudal golden, hind margin broadly yellowish. Colour of preserved specimens uniform yellowish white.

Local name: *Ry-bureki* (Minicoy).

Distribution: Maldives and Laccadives.

Note: *Nemanthias carberryi* Smith and *Entonanthias pascalus* Jordan and Tanaka are undoubtedly related to this species. *N. carberryi* differs mainly in having the first two spines of the dorsal produced, the first ventral ray produced and in having a chrome-yellow band from eye to base of pectoral. *E. pascalus* differs from the species described above in having the pectoral fin distinctly notched in the posterior margin and in having the soft dorsal and anal filamentous. *A. cooperi* is fairly abundant in the bait fish catches during certain seasons.

199. *Anthias squamipinnis* (Peters)

Serranus (Anthias) squamipinnis Peters, Monatsb. Akad. Wiss. Berlin, p. 429, 1855.

Anthias squamipinnis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 104, fig. 15, 1931. Smith, Fishes of Southern Africa, p. 201, pl. 20, fig. 459, 1949. Smith, Ichth. Bull., 21, p. 362, pl. 34, B, C and E, 1961. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 168, fig. 7, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 175/151).

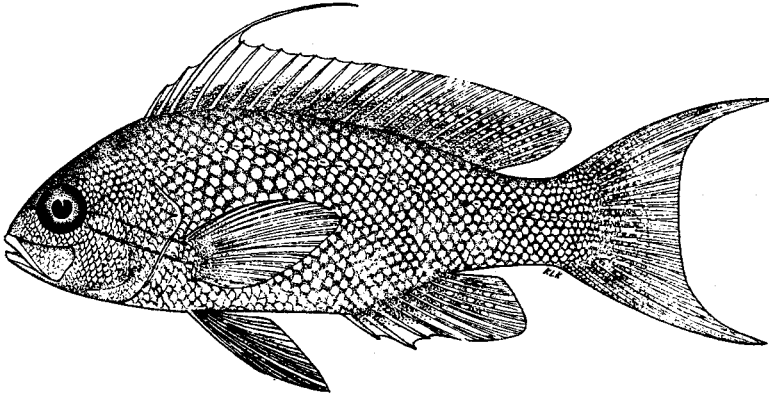


FIG. 199. *Anthias squamipinnis* (Peters), 63 mm.
(after Jones and Kumaran)

Specimens studied: Minicoy (2), 51 and 63 mm.

D. X, 17; A. III, 7; P. ii, 15; V. I, 5. Ll. 40; Ltr. 3+1+15-16.
GR. 9+1+24.

Head 3.1-3.3 in standard length, 4.3-4.6 in total length. Depth of body 2.8-2.9 in standard length, 3.9-4.1 in total length. Eye 3.3-3.5 in head, 0.7 in snout and 1.0-1.1 in interorbital space. Maxillary reaching to below hind border of iris. Posterior border and angle of preoperculum serrated, lower margin smooth. Subopercle and interopercle denticulate. Operculum with 2 spines. Outer row of teeth in upper jaw conical with two short canines in front, inner row of teeth small with two small canines in front; a single row of small teeth in lower jaw with a strong antero-lateral canine on each side and a pair of canines near symphysis. Small patch of teeth on vomer and palatines. First dorsal spine shorter than second and half as long as last and third spine produced into a filament. Second and third anal spines subequal. Pectoral slightly shorter than head. Caudal lunate, outer rays produced with age. Colour: Yellowish with reddish tinge in life. A broad light band edged grey from eye to base of pectoral. Dorsal, anal and pectoral yellowish hyaline, posterior rays of dorsal and anal and median rays of caudal with dusky markings; median rays of ventral slightly dusky.

Local name: *Ry-bureki* (Minicoy).

Distribution: Red Sea, east coast of Africa and neighbouring Islands, Laccadives, Indonesia and Philippines.

200. *Anthias cichlops* (Bleeker)

Serranus cichlops Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 245, 1853.

Anthias cichlops Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 105, 1931. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 167, fig. 6, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 175/152).

Anthias taeniatus Smith, Ichth. Bull., 21, p. 362, fig. 1, 1961.

Specimens studied: Minicoy (7), 40 to 68 mm.

D. X, 16; A. III, 7; P. ii, 17; V. I, 5. L1. 49-50; Ltr. 3 + 1 + 13-14. GR. 9 + 1 + 21-23.

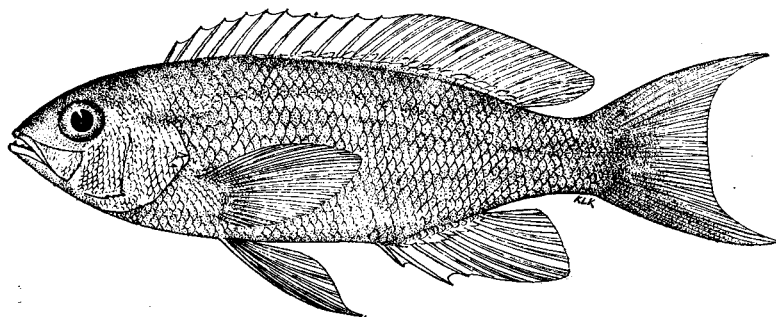


FIG. 200. *Anthias cichlops* (Bleeker), 68 mm. (after Jones and Kumaran)

Head 3.1-3.2 in standard length, 4.1-4.3 in total length. Depth of body 3.0-3.1 in standard length, 4.1-4.2 in total length. Eye 3.3-3.5 in head, 0.6-0.75 in snout and 0.8-1.1 in interorbital space. Maxillary reaching below middle of eye. Hind border and angle of preopercle serrated, serrations at the angle larger and 3 points on lower margin near angle. Suboperculum and interoperculum finely serrated. Three opercular spines. Outer row of teeth in upper jaw slightly larger and with two short canines in front, inner row of teeth villiform; teeth in lower jaw small with an antero-lateral canine on each side and a pair of short canines in front; a triangular patch of teeth on vomer and a narrow band of teeth on palatines. Posterior dorsal spines subequal, slightly longer than anterior spines. Second anal spine slightly longer and stronger than the third. Pectoral equal to ventral, slightly shorter than head. Caudal lunate, lobes pointed. Colour: Reddish with greenish tinge above, becoming yellowish below. Fins yellowish hyaline. Preserved specimens yellowish grey with three light stripes along the body, the first from above eye along the side, the second from behind the eye slightly curving down and running to the base of caudal and the third from below pectoral base to caudal peduncle.

Local name: *Ry-bureki* (Minicoy).

Distribution: Red Sea, Mozambique, Aldabra, Laccadives, Sumatra and Philippines.

Family THERAPONIDAE

Oblong to oblong-ovate body, compressed. Mouth moderate, terminal and protractile. Teeth villiform or conical, in bands in jaws, outer series larger. Teeth sometimes present on vomer and palatines. Gill membranes separate or united, sometimes united with isthmus. Six branchiostegals, pseudobranchiae large. Preoperculum denticulate or strongly serrated. Operculum with two spines. A single dorsal fin with XI-XIV heteracanth spines and 8-14 rays. Anal with III strong spines and 7-12 rays. Scales moderate or small. Lateral line complete.

1. Preoperculum denticulated with strong spines at angle. Depth of body less than head. Four straight, dark lateral bands *Therapon puta*
Preoperculum serrated, serrations at angle moderately enlarged 2
2. Eight scales between base of dorsal and lateral line. About 55 lateral line scales. Three broad, straight brownish lateral bands *Therapon theraps*
13-14 scales between base of dorsal and lateral line. More than 80 lateral line scales. Three blackish downwardly curved lateral bands *Therapon jarbua*

201. *Therapon puta* Cuvier

Therapon puta Cuvier and Valenciennes, Hist. Nat. Poissons, 3, p. 131, 1829. Day, Fishes of India, p. 68, pl. 18, fig. 3, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 143, 1931. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 114/153).

Autisthes puta Munro, Fishes of Ceylon, p. 116, pl. 20, fig. 316, 1955.

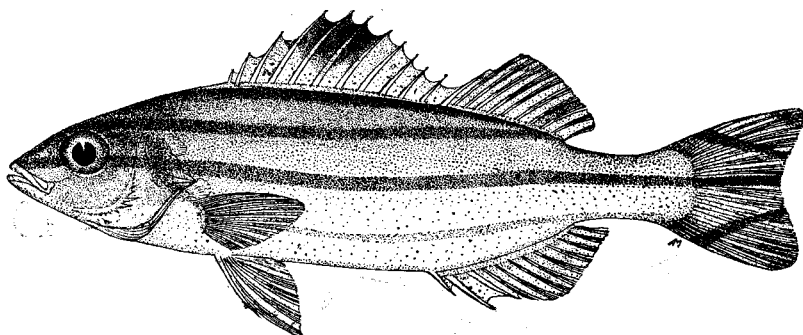


FIG. 201. *Therapon puta* Cuvier, 92 mm.

Specimen studied: Minicoy (1), 92 mm.

D. XII, 10; A.III, 9; P. 14; V. I, 5. L1. 94; Ltr. 13+1+27.

Head 3.6 in standard length, 4.3 in total length. Depth of body 3.7 in standard length, 4.5 in total length. Eye 3.7 in head, equal to snout and 0.8 in interorbital space. Suborbital serrate. Vertical limb of preopercle with 6 spines, 2 inferior spines being longer and stronger than others; lower limb serrated. Operculum with 2 strong spines. Villiform teeth in jaws, the outer row enlarged; vomer and palatines edentulous. Fifth dorsal spine slightly longer than postorbital length of head, last spine much longer than the preceding one. Third anal spine a little longer than the second. Pectoral slightly shorter than ventral. Colour: Brownish grey above, silvery white below with 4 straight longitudinal blackish bands, the third band continued to median caudal rays. Membrane between 3rd and 7th dorsal spine blackish distally, tips of anterior dorsal rays dusky. Pectoral, ventral and anal hyaline. Caudal with two oblique dark bars across lobes.

Local name: *Galikooru* (Minicoy).

Distribution: From the Red Sea, Zanzibar and Madagascar through Laccadives and coasts of India and Ceylon to Indonesia, Indo-china, Philippines, New Britain and Australia.

202. *Therapon theraps* Cuvier

Therapon theraps Cuvier and Valenciennes, Hist. Nat. Poissons, 3, p. 129, pl. 53, 1829. Day, Fishes of India, p. 70, pl. 18, fig. 6, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 145, fig. 26, 1-4, 1931. Smith, Fishes of Southern Africa, p. 183, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 114/154).

Eutherapon theraps Munro, Fishes of Ceylon, p. 116, pl. 20, fig. 315, 1955.

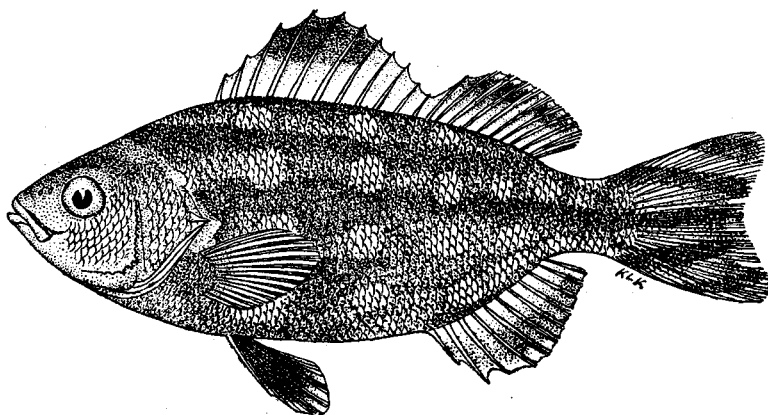


FIG. 202. *Therapon theraps* Cuvier, 63 mm.

Specimens studied: Agathi (2) 62 and 63 mm.

D. XII, 10; A. III, 8; P. 13-14; V. I, 5. L1. 54-56; Ltr. 8 + 1 + 18-20.

Head 3 in standard length, 3.8 in total length. Depth of body 2.5-2.6 in standard length, 3.2-3.3 in total length. Eye 3.7-4.0 in head, equal to or a little less than snout and also in interorbital space. Preorbital serrate, preoperculum serrate, those at angle slightly stronger. Operculum with a minute spine above and a longer spine below. Teeth in jaws in villiform bands, outer row slightly enlarged, vomer and palatines edentulous. Fourth or fifth dorsal spine longest, penultimate spine shorter than the last spine. Third anal spine equal to or slightly longer than the second. Pectoral and ventral subequal, shorter than head without snout. Colour: Greyish brown above, paler below with 3 ill defined broad brownish bands on sides, the lowest continued on to median caudal rays and with oblique bands on caudal lobes. The broad bands on the body tend to make the intervening light areas appear as white patches. A blackish blotch between third and seventh dorsal spine, soft dorsal with 2 blotches distally. Ventral and anal dusky. Pectoral hyaline.

Local name: *Kallakeedam* (Agathi).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, Indo-china, China, Taiwan, Carolines and south to Australia and eastwards to Polynesian Islands.

203. *Therapon jarbua* (Forskål)

Sciaena jarbua Forskål, Descript. Animal., p. 50, 1775.

Therapon jarbua Day, Fishes of India, p. 69, pl. 18, fig. 4, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 147, fig. 26, 5, 1931. Smith, Fishes of Southern Africa, p. 183, fig. 401, 1949. Munro, Fishes of Ceylon, p. 116, pl. 20, fig. 317, 1955. Jones and Kumaran, Indian J. Fish, 6, p. 45, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 114/155).

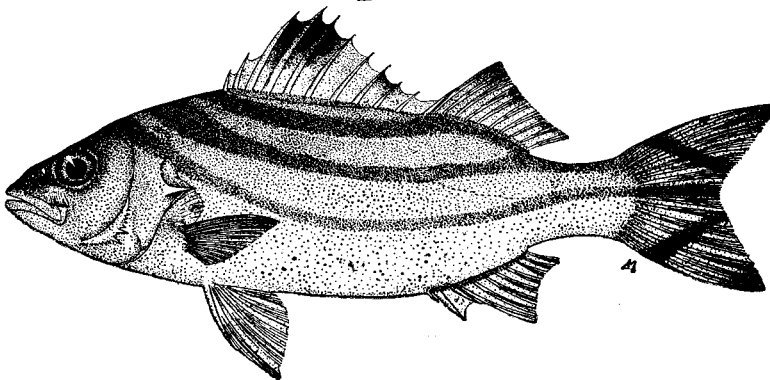


FIG. 203. *Therapon jarbua* (Forskål), 153 mm.

Specimens studied: Ameni (3), 38 to 56 mm. Kalpeni (1), 56 mm. Minicoy (29), 20 to 153 mm.

D. XI, 10; A. III, 8; P. 13; V. I, 5. L1. 84-92; Ltr. 13-14+1+27-29.

Head 2.9-3.3 in standard length, 3.7-4.2 in total length. Depth of body 2.8-3.0 in standard length, 3.6-3.9 in total length. Eye 3.8-4.4 in head, 1.0-1.1 in snout and 1.0-1.2 in almost flat interorbital space. Preorbital serrated, preopercle serrated, two at the angle stronger than others. 2 spines on operculum, the upper one small, the lower strong and produced beyond opercular flap. Teeth villiform in bands in jaws, outer series enlarged and in a row on vomer and palatines. Fourth dorsal spine longest, penultimate spine shorter than the last spine. Second and third anal spines subequal. Pectoral about $\frac{1}{3}$ eye diameter longer than postorbital length of head, ventral slightly longer than pectoral. Colour: Bluish brown above, silvery white below with three blackish downwardly curved bands on sides of body, the lowest continued on median rays of caudal. A large black blotch between 3rd and 7th spine of dorsal, distal margin of membranes between posterior spines often blackish, soft dorsal with 2 or 3 dark spots distally, anal whitish, anterior rays dusky. Pectoral and ventral hyaline. Caudal with one oblique blackish band on upper and another on lower lobe, the upper and sometimes the lower lobe tipped with black.

Local names: *Galikooru* (Minicoy). *Kallakeedam*, *Kotha* (other islands).

Distribution: Widespread from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Taiwan, Japan and Solomon, Fiji, Samoan and Tonga Islands; south to Australia.

Family KUHLIIDAE

Elongate oval body, moderately compressed. Mouth moderate, protractile. Fine teeth in bands in jaws; teeth present on vomer and palatines. Gill membranes separate. Six branchiostegals. Pseudobranchiae present. Dorsal fin single with X strong spines and 10-12 rays. Anal with III strong spines and 9-13 rays. Preorbital and preoperculum denticulate; two spines on operculum. Scales moderate, ctenoid. Lateral line complete.

204. *Kuhlia taeniura* (Cuvier)

Dules taeniurus Cuvier and Valenciennes, Hist. Nat. Poissons, 3, p. 114, 1829. Smith, Fishes of Southern Africa, p. 187, fig. 412, 1949.

Dules argenteus Day, Fishes of India, p. 65, pl. 18, fig. 2, 1878.

Kuhlia taeniura Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5 p. 273, 1929. Jones, Bull. cent. mar Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CM FRI-LA-F. 117/157).

Kuhlia taeniurus Munro, Fishes of Ceylon, p. 117, pl. 20, fig. 319, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 45, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 653, fig. 13, (1962) 1964.

Specimens studied: Agathi (2), 24 and 28 mm. Ameni (6), 36 to 64 mm. Androth (14), 38 to 90 mm. Bangaram (9), 60 to 78 mm. Bitra (2), 65 and 66 mm. Chetlat (12), 110 to 180 mm. Kadamat (6), 20 to 44 mm. Kalpeni (14), 56 to 156 mm. Kavarathi (13), 48 to 158 mm. Kiltan (30), 25 to 55 mm. Minicoy (16), 35 to 194 mm. Suheli (6), 43 to 85 mm.

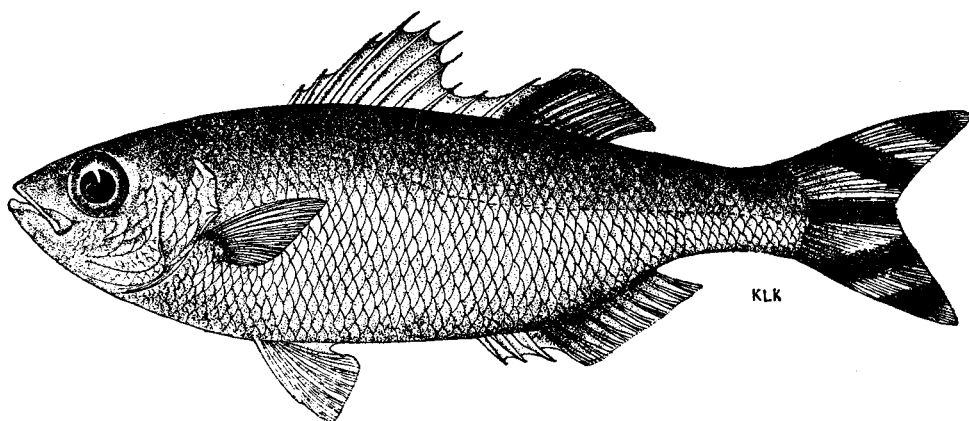


FIG. 204. *Kuhlia taeniura* (Cuvier), 190 mm.

D. X, 10-11; A. III, 10-11; P. 14; V. I, 5. L1. 52-56; Ltr. 5-6+1+12-13.

Head 3.3-3.7 in standard length, 4.2-4.6 in total length. Depth of body 2.8-3.2 in standard length, 3.5-4.0 in total length. Eye 3.0-3.3 in head, about 0.7-0.8 in snout and 1.0-1.2 in interorbital space. Lower edge of preorbital finely serrated. Lower limb of preopercle denticulated. Opercle with 2 spines. Villiform teeth in jaws, vomer and palatines. Pectoral $\frac{1}{4}$ eye diameter shorter than head without snout, ventral shorter than pectoral. 4th or 5th dorsal spine longest. Second anal spine slightly shorter, but stouter than the third. Colour: Bluish grey above, silvery white on sides and abdomen. Dorsal fins pale, membrane between spines slightly dusky distally, anterior rays of dorsal darker. Pectoral and ventral white with yellowish tinge. Anal pale, anterior rays sometimes dusky distally. Caudal whitish with 2 blackish oblique bars across either lobes and another along the median rays.

Local names: *Kattaphuli* (Minicoy). *Mullan* (other islands).

Distribution: Widespread from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and eastwards to the Galapagos and islands off the coast of Mexico.

Family PRIACANTHIDAE

Body oblong or ovate and strongly compressed. Mouth large, protractile and highly oblique, chin prominent. Maxillary without a supplemental bone, exposed. Preorbital narrow, often serrated. Preoperculum entire or serrated, angle with a strong flat spine. Gill membranes separate, not attached to isthmus. Six branchiostegals. Pseudobranchiae large. Teeth conical in several rows in jaws. Dorsal fin single with X strong spines and 11-15 divided rays. Anal with three strong spines and 10-15 rays. Scales small or fairly large, cycloid or weakly ctenoid. Lateral line complete, convexly curved anteriorly.

- D. X, 14-15; A. III, 15-16; L1. 78-85. Preopercular spine short. Ventral longer than head without snout *Priacanthus hamrur*
 D. X, 13; A. III, 14; L1. 70-72. Spine at angle of preopercle strong. Ventral equal to head without snout *Priacanthus cruentatus*

205. *Priacanthus hamrur* (Forskål)

Sciaena hamrur Forskål, Descript. Animal., p. 45, 1775.

Priacanthus hamrur Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 384, fig. 93, 1929. Munro, Fishes of Ceylon, p. 118, pl. 20, fig. 323, 1955. Smith and Smith, Fishes of Seychelles, p. 13, pl. 9, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 116/158).

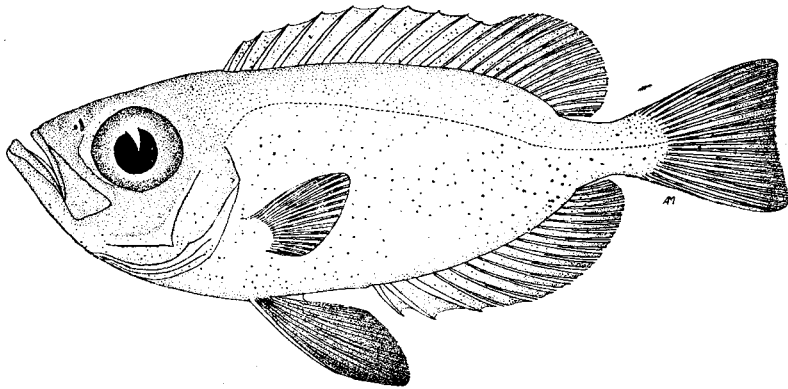


FIG. 205. *Priacanthus hamrur* (Forskål), 75 mm.

Specimens studied: Agathi (6), 84 to 100 mm. Minicoy (1), 75 mm.

D. X, 14-15; A. III, 15-16; P. ii, 16; V. I, 5. L1. 78-85; Ltr. 9 + 1 + 40-45. GR. 4-6 + 1 + 17-19.

Head 2.7-2.9 in standard length, 3.5-3.7 in total length. Depth of body 2.6-2.7 in standard length, 3.3-3.6 in total length. Eye 2.3-2.5 in head,

0.6-0.7 in snout and also in interorbital space. Body moderately elongate, compressed. Maxillary reaching to below front border of iris or slightly beyond. Two irregular rows of small conical teeth in jaws; in villiform band on vomer and palatines. Preorbital and preoperculum finely denticulate; a short blunt and flat spine at angle of preopercle. Hind dorsal spines about equal to eye or slightly longer. Third anal spine slightly longer than second and equal to $4/5$ of eye diameter. Spines and rays of dorsal, anal and ventral feebly spinulose. Pectoral about $1\frac{1}{2}$ eye diameter; ventral about $2/3$ length of snout shorter than head. Posterior margin of caudal concave. Colour: Light reddish brown becoming pale whitish below. Dorsal, anal and caudal dusky to dark. Ventral becoming dark towards the edge with a diffuse blackish spot basally between spine and third ray.

Local names: *Lobodugini* (Minicoy). *Kulakkathi*, *Mannaram* (Agathi).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Japan and eastwards to Solomon and Hawaiian Islands.

206. *Priacanthus cruentatus* (Lacépède)

Labrus cruentatus Lacépède, Hist. Nat. Poissons, 3, p. 522, 1802.

Priacanthus cruentatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 386, 1929. Jones Bull. cent. mar. Fish. Res. Inst., 8, p. 11, 1969 (Cat. No. CMFRI-LA-F. 116/159).

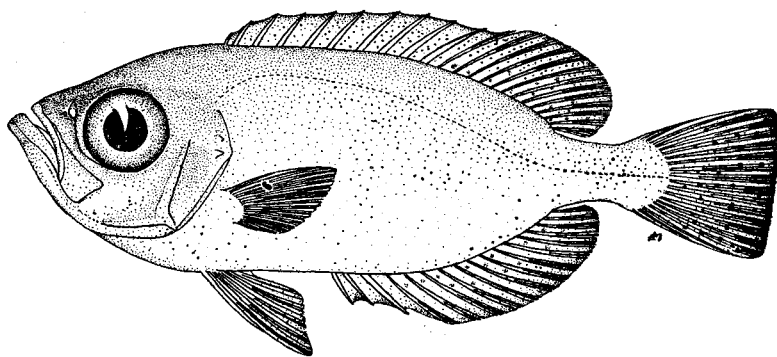


FIG. 206. *Priacanthus cruentatus* (Lacépède), 142 mm.

Specimens studied: Minicoy (3), 95 to 190 mm.

D. X, 13; A. III, 14; P. ii, 16; V. I, 5. L1. 70-72; Ltr. 10+1+48-50. GR. 5+1+17.

Head 2.9-3.0 in standard length, 3.7-3.8 in total length. Depth of body 2.5 in standard length, 2.3 in total length. Body oblong, compressed. Eye 2.4-2.5 in head, about 0.7 in snout and 0.6 in interorbital space. Maxillary reaching beyond a vertical from the front border of iris. Preorbital and preoperculum finely denticulate, the latter with a strong flat spine at its angle reaching edge of operculum. Two irregular rows of small conical teeth in jaws; fine teeth in a narrow band on vomer and palatines. Spines of dorsal spinulose, gradually increasing in length, the last being slightly shorter than eye diameter. Anal spines somewhat smooth; the third longest, somewhat more than $\frac{1}{2}$ diameter of eye. Pectoral about equal to eye and half length of snout. Ventral as long as head without snout, its spine strongly spinulose. Hind margin of caudal fin truncate. Colour: Light reddish grey above, lighter to whitish below. Spinous dorsal slightly dark at margin; soft dorsal, anal and caudal pale with dark spots. Ventral greyish.

Local name: *Lobodugini* (Minicoy).

Distribution: Tropical and subtropical Atlantic, Indian and Pacific Oceans.

Family APOGONIDAE

Body almost oblong to elongate, compressed and generally covered with cycloid scales on head and ctenoid scales on body or sometimes wholly cycloid. Mouth large, teeth generally in villiform bands in jaws or sometimes caniniform; teeth sometimes present on vomer, palatines and on intermaxillary. Two dorsal fins, the first of 6-9 spines, the second of one spine and 8-11 soft rays. Anal of two spines and 8-17 soft rays. Seven branchiostegals. Gill membranes separate. Pseudobranchiae present. Operculum with double edges, sometimes crenulated. Lateral line usually complete, sometimes incomplete.

1. Teeth minute or villiform; no canines 2
 Teeth minute or villiform; symphysial or intermaxillary canines present 18
2. All scales cycloid, easily shed 3
 Scales on body ctenoid, not easily shed 4
3. 9 anal rays. 10-11 lower gill rakers *Rhabdamia cypselurus*
 12-13 anal rays. 20-21 lower gill rakers. A brown stripe from snout through eye to operculum *Rhabdamia gracilis*
4. 16-17 anal rays. About 20 narrow red bars across body. A black spot at caudal base *Archamia fucata*
 Less than 10 anal rays 5
5. Lateral line incomplete 6
 Lateral line complete 7

6. No palatine teeth. A white edged dark brown ocellus on operculum *Fowleria aurita*
 Palatine teeth present. No ocellus on operculum *Foa brachygramma*
7. 6 spines in first dorsal 8
 7 spines in first dorsal 10
8. 9 rays in anal. Second dorsal spine filamentous *Apogon leptacanthus*
 8 rays in anal 9
9. A distinct blackish band from snout through eye to opercle and a blackish spot near caudal base *Apogon sangiensis*
 Body scarlet; small dark blotches about nape. No dark spot at caudal base *Apogon coccineus*
10. Preopercle ridge and suborbital strongly spinate 11
 Preopercle ridge smooth 12
11. Dark brown, almost straight stripe from snout through eye tapering posteriorly on caudal peduncle. More than half of the spot at caudal base above lateral line *Pristiapogon fraenatus*
 Dark brown lateral stripe from snout through eye to caudal peduncle of almost uniform width. Lower border of spot at caudal base only touches the lateral line *Pristiapogon snyderi*
12. Caudal distinctly rounded. A black light edged ocellus between third or fourth and seventh dorsal spines *Apogonichthys ocellatus*
 Caudal distinctly emarginate or forked. No ocelli on first dorsal 13
13. An oblique bar from eye to angle of preopercle 14
 No oblique bar from eye 15
14. Dark oblique bar from eye only slightly wider below the eye than at the angle of preopercle. Dark saddle over caudal peduncle continued below the lateral line. GR. 22-24 *Ostorhynchus nubilus*
 Dark oblique bar below eye much wider below the eye than at the angle of preopercle. Dark saddle over caudal peduncle reaching down to lateral line. GR. 25-28 *Ostorhynchus savayensis*
15. Dark longitudinal bands on body 16
 No dark longitudinal bands on body 17
16. Two dark bands on upper part of body only. Orbital rim serrated *Ostorhynchus quadrifasciatus*
 Six dark bands along sides; the third band narrower than the rest and curving down towards the fourth stripe. Preorbital height about $\frac{1}{3}$ eye diameter. Orbital rim not serrated *Ostorhynchus endekataenia*
 Five dark bands along sides. Preorbital height $\frac{1}{4}$ eye diameter. Orbital rim not serrated *Ostorhynchus novemfasciatus*

17. Caninoid teeth present in jaws. Caudal lobes pointed. An ill defined brown streak from snout to eye sometimes continued behind eye
 *Ostorhynchus apogonides*
 No caninoid teeth. Caudal lobes rounded. No dark streak on head
 *Ostorhynchus moluccensis*
18. Body completely scaleless. A preopercular spine and a transparent membraneous preopercular flap present *Gymnapogon africanus*
 Body with scales. No preopercular spine or membraneous preopercular flap
 19
19. Lateral line complete. Scales large, ctenoid 20
 Lateral line incomplete and ending below second dorsal. Scales small, cycloid *Pseudamia gelatinosa*
20. Villiform teeth present in lower jaw. Five longitudinal dark stripes along sides, the middle one ending in a yellow edged black spot at caudal base
 *Paramia quinquelineata*
 No villiform teeth in lower jaw. Eight narrow longitudinal dark stripes along sides, the intermediate bands narrower. A large yellow edged black spot at caudal base *Cheilodipterus lachneri*

207. *Rhabdamia cypselurus* Weber

Rhabdamia cypselurus Weber, Notes Leyden Mus., 31, p. 167, 1909. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 358, fig. 86, 1929. Smith, Ichth. Bull., 22, p. 376, pl. 46, C, 1961. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 293, fig. 10, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/160).

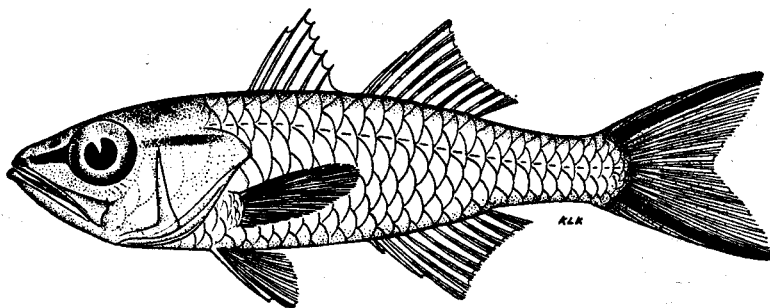


FIG. 207. *Rhabdamia cypselurus* Weber, 35 mm.
 (after Jones and Kumaran)

Specimens studied: Kalpeni (4), 31 to 34 mm. Minicoy (49), 26 to 36 mm.

D₁. VI; D₂. I, 9; A. II, 9; P. ii, 11; V. I, 5. Ll. 24-25; Ltr. 2+1+6.

Head 2.6-2.9 in standard length, 3.2-3.5 in total length. Depth of body 3.7-3.9 in standard length, 4.6-4.9 in total length. Eye 3.2-3.4 in head, about

0.8 in snout and 0.7-0.8 in interorbital space. Maxillary reaching to below middle of eye. A narrow band of villiform teeth in upper jaw; a single row of teeth in lower jaw with a few more in front. An irregular patch of teeth on vomer. Preopercle ridge and preopercle margin smooth. Pectoral equal to postorbital part of head plus half eye diameter. Ventral equal to or less than half length of head. Colour: Pinkish with dark brown band from snout through eye to upper part of opercle. Some specimens with brownish line at base of anal on body. Fins transparent; caudal lobes with intramarginal dark stripes.

Local names: *Himabodi* (Minicoy). *Poothathechala* (Kalpeni).

Distribution: Coast of South Africa, Aldabra, Seychelles, Laccadives, Indonesia, Philippines and Bikini Atoll.

208. *Rhabdamia gracilis* (Bleeker)

Apogonichthys gracilis Bleeker, Nat. Tijds. Ned.-Ind., 10, p. 371, 1856.

Apogonichthys nudus Regan, J. Bombay nat. Hist Soc., 16, p. 321, pl. 3, fig. 6, 1905.

Rhabdamia gracilis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 357, fig. 85, 1929. Smith, Ichth. Bull., 22, p. 376, fig. 1, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/161).

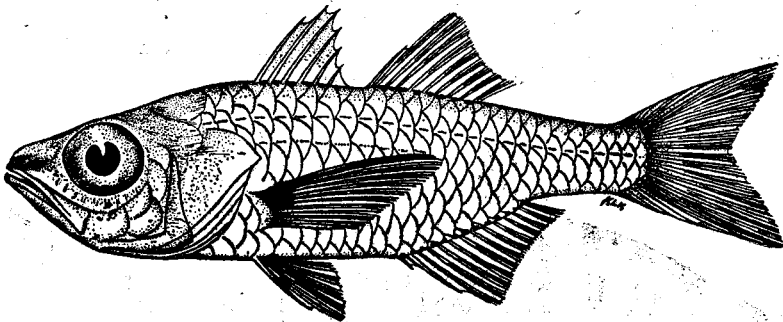


FIG. 208. *Rhabdamia gracilis* (Bleeker), 37 mm.

Specimens studied: Kalpeni (2), 35 and 36 mm. Minicoy (6), 26 to 38 mm.

D₁. VI; D₂. I, 9; A. II, 12-13; P. ii, 11; V. I, 5; Ll. 24-25; Ltr. 2+1+6.

Head 2.5-2.8 in standard length, 3.2-3.5 in total length. Depth of body 3.5-3.7 in standard length, 4.3-4.6 in total length. Eye 3.2-3.4 in head, snout $\frac{3}{4}$ of eye and equal to interorbital space. Preopercle ridge and margin smooth. Maxillary reaching to below anterior $\frac{3}{5}$ th of eye. Teeth in jaws uniserial on sides, irregularly biserial in front in both jaws; a few teeth on vomer and palatines. Pectoral equal to head without snout or a little longer. Ventral as long as

half length of head. Colour: Pinkish; back, tip of snout and lower jaw slightly dusky. Small brown spots in a row along bases of spinous dorsal, soft dorsal and anal and a narrow dark line formed by spots on the middle of sides from operculum to above middle of anal fin. A dusky line at base of caudal. Small brownish spots on spines of first dorsal. Other fins transparent. Caudal lobes pale to dusky.

Local names: *Himabodi* (Minicoy). *Poothathechala* (Kalpeni).

Distribution: Coast of South Africa, Karachi (Pakistan), Laccadives, Indonesia and Philippines.

209. *Archamia fucata* (Cantor)

Apogon fucatus Cantor, J. Asiatic Soc. Bengal, **18**, p. 986, 1850.

Apogon lineolatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **5**, p. 347, 1929 (in part).

Apogon macropterus Day, Fishes of India, p. 64, pl. 17, fig. 4, 1878 (in part).

Archamia fucata Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/162).

Archamia lineolata Smith, Fishes of Southern Africa, p. 209, pl. 23, fig. 490, 1949 (not of Cuvier and Valenciennes).

Archamia lineolatus Munro, Fishes of Ceylon, p. 119, pl. 21, fig. 325, 1955 (not of Cuvier and Valenciennes), Jones and Kumaran, Indian J. Fish., **6**, p. 45, 1959 (not of Cuvier and Valenciennes). Jones, Proc. Symposium on Scombroid Fishes, p. 655, fig. 16, (1962) 1964 (not of Cuvier and Valenciennes).

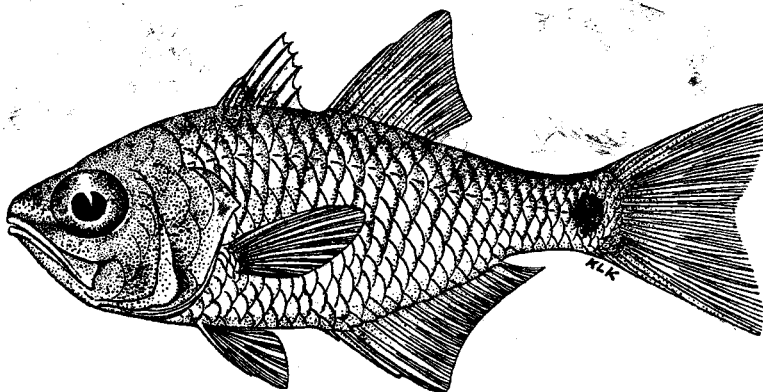


FIG. 209. *Archamia fucata* (Cantor), 55 mm.

Specimens studied: Agathi (8), 35 to 48 mm. Ameni (7), 30 to 52 mm. Bitra (5), 42 to 67 mm. Kalpeni (44), 32 to 63 mm. Minicoy (49), 20 to 55 mm.

D₁. VI; D₂. I, 9; A. II, 16-17; P. ii, 12-13; V. I, 5. Ll. 24-26; Ltr. 2+1+7.

Head equal to depth of body, 2.5-2.7 in standard length, 3.2-3.4 in total length. Eye 2.8-3.0 in head, 0.6 in snout and 0.7 in interorbital space. Maxillary reaching to below hind half of eye. A few rows of small teeth in jaws and some teeth on vomer and palatines. Hind margin of preoperculum finely serrated. Pectoral shorter than head without snout. Ventral equal to or exceeding length of postorbital part of head. Colour: Reddish yellow with about 20 red transverse lines on sides and dark spots on cheek, opercle and sides of body and a diffuse black spot at caudal base. Some specimens with a dusky band from tip of upper jaw to eye. Fins yellowish, edges of spinous dorsal blackish.

Local names: *Rybodi* (Minicoy). *Chonnapoothan* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India and Ceylon, Indonesia, Philippines, Marshall and Samoan Islands.

210. *Fowleria aurita* (Valenciennes)

Apogon auritus Cuvier and Valenciennes, Hist. Nat. Poissons, 7, p. 443, 1831. Day, Fishes of India, p. 63, pl. 17, fig. 2, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 325, 1929 (in part).

Fowleria aurita Smith, Ichth. Bull., 22, p. 382, pl. 51, D and fig. 4, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/163).

Papillapogon auritus Smith, Fishes of Southern Africa, p. 209, pl. 23, fig. 491, 1949.

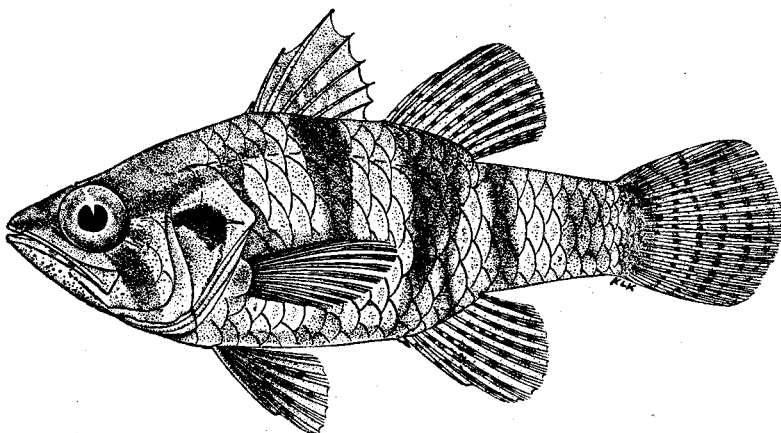


FIG. 210. *Fowleria aurita* (Valenciennes), 48 mm.

Specimens studied: Agathi (8), 34 to 43 mm. Chetlat (5), 25 to 32 mm. Kavarathi (3), 23 to 29 mm. Kiltan (4), 26 to 32 mm. Minicoy (44), 25 to 52 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 11-12; V. I, 5. Ll. 11-13; Llat. 22-24; Ltr. 2+1+6.

Head 2.4-2.7 in standard length, 3.0-3.4 in total length. Depth of body 2.6-2.9 in standard length, 3.3-3.6 in total length. Eye 3.3-3.7 in head, 0.7-0.8 in snout and 0.6-0.7 in interorbital space. Teeth villiform in several rows in jaws and in narrow bands on vomer; no teeth on palatines. Preopercle ridge and margin entire. Maxilla reaching to almost below hind border of eye. Anterior nostril an elongate tubule. Palatine teeth wanting. First dorsal spine short, 2nd exceeding half length of 3rd. Ventral equal to or slightly longer than snout and eye, pectoral a little longer than ventral. Lateral line ending below end of soft dorsal. Colour: Yellowish brown with brown spots on scales and a dark brown ocellus edged white on operculum. Some specimens with an oblique brown bar across cheek from the eye. Vertical fins pale with brown bars or spots. Pectoral light. Ventral brownish or with brown spots.

Local names: *Fehibodi* (Minicoy). *Poothan* (other islands).

Distribution: East coast of Africa, Red Sea to the Laccadives, coasts of India, Indonesia, Philippines and Queensland and eastwards to Samoa and Tonga Islands.

211. *Foa brachygramma* (Jenkins)

Fowleria brachygrammus Jenkins, Bull., U.S. Fish. Comm., 22, p. 448, fig. 20, 1903.

Foa brachygramma Smith, Ichth. Bull., 22, p. 383, pl. 48, C, 1961. Smith and Smith, Fishes of Seychelles, p. 18, pl. 61, C, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 10, p. 323, fig. 4, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat No. CMFRI-LA-F. 84/515).

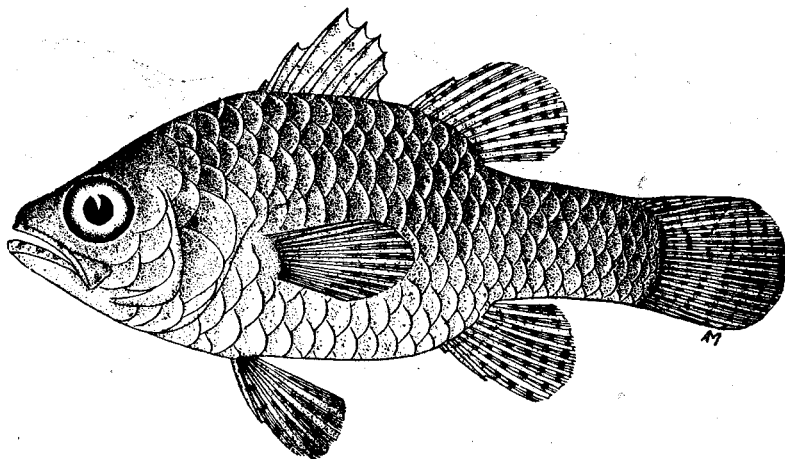


FIG. 211. *Foa brachygramma* (Jenkins), 41 mm. (after Jones and Kumaran)

Specimens studied: Kavarathi (5), 28 to 35 mm. Minicoy (3), 34 to 41 mm. D₁. VII; D₂. I, 9; A. II, 8; P. ii, 10; V. I, 5. Ll. 9-10; Ltr. 1+1+6.

Head 2.4-2.6 in standard length, 3.0-3.3 in total length. Depth of body 2.2-2.4 in standard length, 2.8-3.0 in total length. Eye 3.3-3.4 in head, 0.6-0.7 in snout and 0.6 in interorbital space. Preopercle, opercle and suborbital entire. Maxilla extending behind a vertical from the hind margin of pupil. Villiform bands of teeth in jaws and on vomer and a narrow band on palatines. Third dorsal spine longest, about 1.5 times eye. Second anal spine about equal to eye. Pectoral longer than postorbital length of head. Ventral as long as pectoral. Lateral line incomplete, ending below front rays of second dorsal. Colour: Yellowish brown. Dark spots on dorsal, anal and caudal. Ventral dusky to dark. Pectoral pale yellowish.

Local name: *Fehibodi* (Minicoy).

Distribution: Natal northwards to Mozambique and Kenya, Seychelles and Laccadives in the Indian Ocean, and Hawaiian Islands and just south of Philippines in the Pacific.

212. *Apogon leptacanthus* Bleeker

Apogon leptacanthus Bleeker, Nat. Tijds. Ned.-Ind., 12, p. 204, 1856. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 344, 1929. Smith, Ichth. Bull., 22, pl. 46, G, 1961. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 287, fig. 3, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 2, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/164).

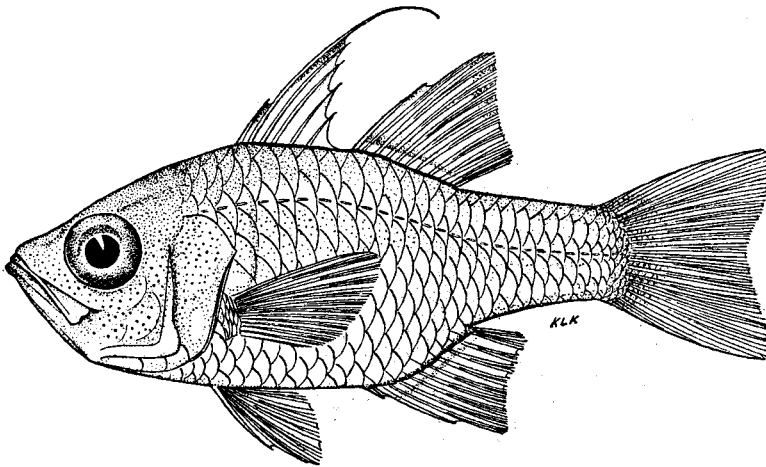


FIG. 212. *Apogon leptacanthus* Bleeker, 36 mm. (after Jones and Kumaran)

Specimens studied: Agathi (23), 21 to 38 mm. Bitra (4), 25 to 30 mm. Chetlat (7), 22 to 26 mm. Kalpeni (260), 32 to 42 mm. Minicoy (40), 30 to 38 mm.

D₁. VI; D₂. I, 9; A. II, 9; P. ii, (11) 12; V. I, 5. L1. 24-26; Ltr. 2+1+6½.

Head 2.5-2.7 in standard length, 3.3-3.5 in total length. Depth of body 2.4-2.6 in standard length, 3.1-3.4 in total length. Eye 2.5-2.7 in head, 0.5-0.6 in snout and 0.6 in interorbital space. Angle of preopercle and lower margin finely denticulate. Preopercle ridge and preorbital smooth. Maxilla reaching scarcely below middle of eye. First dorsal spine less than eye diameter, second spine filamentous, its length exceeding length of head. Pectoral equal to or shorter than head without snout. Ventral slightly exceeding half length of head. Colour: Body uniformly rosy or yellowish with fine brownish spots on head. Fins transparent. Base of first dorsal, second dorsal and anal with a dark line continued along dorsal and ventral midline of caudal peduncle. First and second dorsal spines blackish. Second dorsal usually with a pale dusky sub-basal longitudinal stripe.

Local names: *Rybodi* (Minicoy). *Poothan* (other islands).

Distribution: Coast of East Africa to the Laccadives, Indonesia, Philippines and Marshall Islands.

213. *Apogon sangiensis* Bleeker

Apogon sangiensis Bleeker, Nat. Tijds. Ned.-Ind., 13, p. 375, 1857. Day, Fishes of India, p. 64, pl. 17, fig. 3, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 343, 1929. Smith, Fishes of Southern Africa, p. 207, fig. 478, 1949. Jones, Proc. Symposium on Scombroid Fishes, p. 657, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/165).

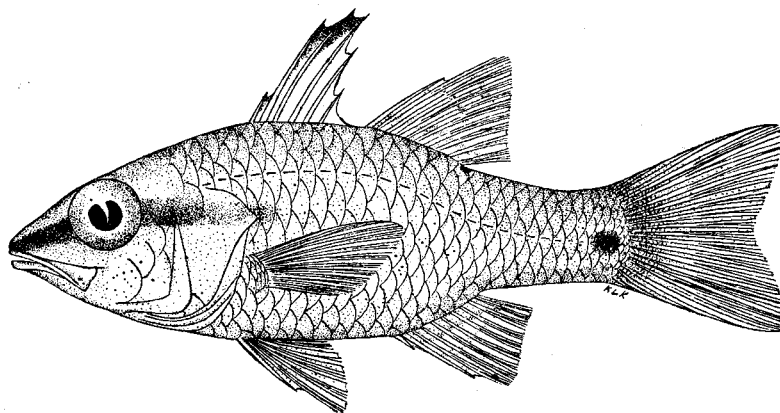


FIG. 213. *Apogon sangiensis* Bleeker, 48 mm.

Specimens studied: Agathi (5), 28 to 44 mm. Kadamat (8), 32 to 40 mm. Kalpeni (22), 36 to 48 mm. Kavarathi (7), 32 to 45 mm. Minicoy (61), 32 to 54 mm.

D₁. VI; D₂. I, 9; A. II, 8; P. ii, 12; V. I, 5. Ll. 25-26; Ltr. 2+1+6½.

Head 2.4-2.6 in standard length, 3.1-3.4 in total length. Depth of body 2.8-3.0 in standard length, 3.5-3.8 in total length. Eye 3.0-3.3 in head, about 0.8 in snout and 0.6-0.7 in interorbital space. Maxillary reaching to below middle of eye. Teeth villiform, in bands in jaws. Teeth in a single row on palatines. Preopercle finely serrated. Preopercular ridge, preorbital and orbital rim smooth. Pectoral shorter than head without snout. Ventral shorter than pectoral, as long as snout and eye together. In some specimens the third and fourth spines slightly prolonged to a filament. Colour: Golden with fine brown speckles on body, a black band from snout through eye to the posterior border of operculum and a round black spot near the base of caudal. A blackish area at origin of first dorsal and at origin of second dorsal and a black spot at hind end of base of second dorsal. Front border of first dorsal black. Fins generally pale yellowish to hyaline, soft dorsal and anal slightly dusky or with dusky sub-basal band for anal fin.

Local names: *Rybodi* (Minicoy). *Chonnapoothan* (other islands).

Distribution: East coast of Africa, Laccadives, Andamans, Indonesia, Philippines, Marshall Islands and New Hebrides.

214. *Apogon coccineus* Rüppell

Apogon coccineus Rüppell, Neue Wirbelt., Fische Rothen Meeres, p. 88, pl. 22, fig. 5, 1835. Smith, Ichth. Bull., 22, p. 387, pl. 47, C, 1961. Smith and Smith, Fishes of Seychelles, p. 18, pl. 59, C, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, **9**, p. 2, fig. 2, 1967. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/166).

Apogon campbelli Smith, Fishes of Southern Africa, p. 506, pl. 97, fig. 479 a, 1949.

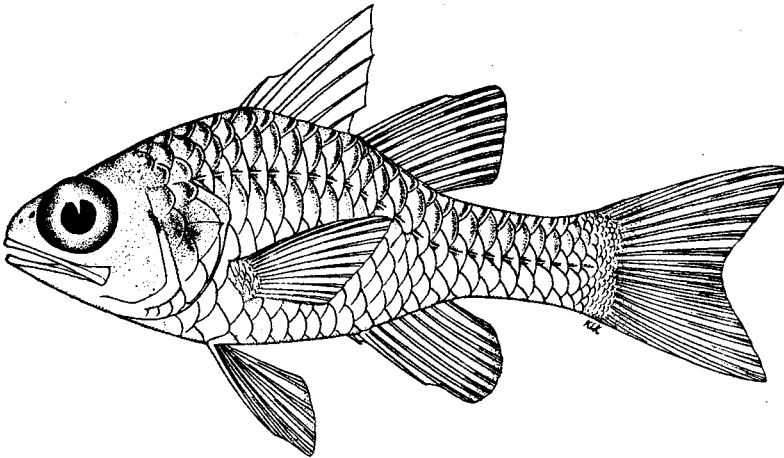


FIG. 214. *Apogon coccineus* Rüppell, 33 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (11), 21 to 33 mm.

D₁. VI; D₂. I, 9; A. II, 8; P. ii, 11; V. I, 5. Ll. 22-24; Ltr. 2+1+6.

Head 2.6-2.8 in standard length, 3.4-3.6 in total length. Depth of body 2.5-2.7 in standard length, 3.3-3.5 in total length. Eye 2.9-3.0 in head, 0.5-0.6 in snout and 0.7 in interorbital space. Maxillary almost reaching to a level from hind border of eye. Hind margin of preopercle denticulate. Preopercle ridge and preorbital smooth. Pectoral shorter than postorbital length of head and eye together. Ventral shorter than pectoral. Colour: Uniform scarlet; interorbital dusky and dark spots on scales of opercle, nape and back. Fins transparent.

Local name: *Rybodi* (Minicoy).

Distribution: East coast of Africa, Red Sea, Seychelles, and Laccadives in the Indian Ocean and Philippines and Marshall Islands in the Pacific.

215. *Pristiapogon fraenatus* (Valenciennes)

Apogon fraenatus Valenciennes, Nouv. Ann. Mus. Hist. Nat. Paris, 1, p. 57, pl. 4, fig. 4, 1832.

Apogon fraenatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 295, 1929 (in part). Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959.

Pristiapogon fraenatus Smith, Ichth. Bull., 22, p. 389, pl. 51, F and pl. 52, E, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/167).

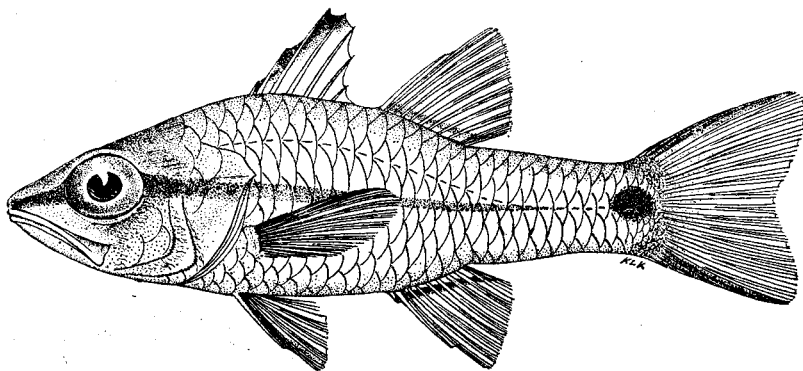


FIG. 215. *Pristiapogon fraenatus* (Valenciennes), 48 mm.

Specimens studied: Chetlat (23), 34 to 50 mm. Minicoy (45), 30 to 53 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 12; V. I, 5. Ll. 25-26; Ltr. 2+1+6.

Head 2.5-2.7 in standard length, 3.3-3.5 in total length. Depth of body 3.1-3.3 in standard length, 4.0-4.2 in total length. Eye 3.0-3.3 in head, 0.7-0.8 in snout and 0.7 in interorbital space. Maxillary reaching to below or slightly

behind middle of eye. Teeth in villiform bands in jaws and a narrow band on vomer and on palatines. Preopercle ridge with strong denticulations, margin serrate. Suborbital strongly serrate. Pectoral longer than snout and eye together; ventral shorter. Colour: Head and body pale yellow with brownish tinge above. A horizontal dark brown stripe from snout through eye and operculum tapering posteriorly on caudal peduncle. A blackish brown spot at base of caudal, most of the spot above lateral line. Membrane between anterior three or four spines of first dorsal dark, remainder of the fin lighter. Second dorsal and anal lighter with a narrow sub-basal dusky stripe. Upper and lower border of caudal dark. Membrane between outer rays of ventral dusky.

Local names: *Murakibodi* (Minicoy). *Poothan* (Chetlat).

Distribution: East coast of Africa and Red Sea to the Laccadives, Indonesia, Philippines and Marshall Islands.

216. *Pristiapogon snyderi* (Jordan and Evermann)

Apogon snyderi Jordan and Evermann, Bull. U.S. Fish. Comm., 22, p. 180, 1902.

Apogon frenatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 295, 1929 (in part). Jones, Proc. Symposium on Scombroid Fishes, p. 655, (1962) 1964 (not of Valenciennes).

Pristiapogon snyderi Smith, Ichth. Bull., 22, p. 390, fig. 49, B, 1961. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 291, fig. 8, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/168).

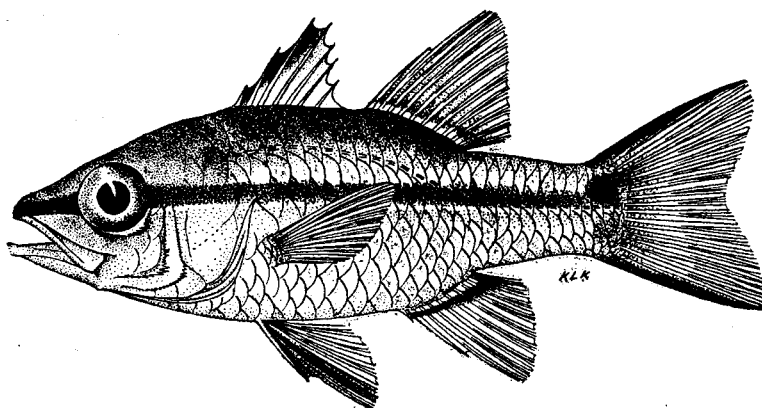


FIG. 216. *Pristiapogon snyderi* (Jordan and Evermann), 83 mm.
(after Jones and Kumaran)

Specimens studied: Agathi (2), 46 and 62 mm. Ameni (1), 63 mm. Chetlat (6), 38 to 44 mm. Kadamat (1), 45 mm. Kalpeni (17), 24 to 88 mm. Kavarathi (4), 44 to 56 mm. Minicoy (18), 46 to 103 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 11; V. I, 5. Ll. 24-26; Ltr. 2+1+7.

Head 2.5-2.7 in standard length, 3.2-3.5 in total length. Depth of body 2.8-3.0 in standard length, 3.5-3.7 in total length. Eye 3.0-3.3 in head, 0.8 in snout and about 0.7 in interorbital space. Teeth in bands in jaws, vomer and palatines toothed. Serrations on the preopercle ridge stouter and longer than those on the preopercle margin. Suborbital with strong sharp spines. Maxilla extending to below middle of eye. Pectoral equal to postorbital part of head plus half eye diameter. Ventral equal to pectoral or slightly shorter. Colour: Pale brown, lighter below with a broad dusky brown lateral band of almost uniform width from tip of snout through eye and ending in a diffuse dark spot at caudal base just above lateral line, its lower border touching the lateral line. A brownish area on upper part of body from anterior to spinous dorsal to below base of second dorsal. Spinous dorsal dusky, upper portion of membrane between anterior 4 spines dark. Second dorsal and anal with dark sub-basal bands. Front border of second dorsal and anal brownish in large specimens. Upper and lower edges of caudal narrowly dusky. Two outer rays of ventral brownish, remainder of fin transparent. Pectoral transparent.

Local names: *Bodubodi* (Minicoy). *Kottapoothan* (other islands).

Distribution: East coast of South Africa to the Red Sea, Laccadives, Indonesia, Philippines, Johnston Island and Marianas, Marshall, Samoan, Tuamotu and Hawaiian Islands.

217. *Apogonichthys ocellatus* (Weber)

Apogon ocellatus Weber, *Siboga-Exped.*, 57, Fische, p. 231, 1913. Weber and de Beaufort, *Fishes of the Indo-Australian Archipelago*, 5, p. 327, 1929.

Apogonichthys ocellatus Smith, *Ichth. Bull.*, 22, p. 391, pl. 47, J. & pl. 48 B, 1961. Jones and Kumaran, *J. Mar. biol. Ass. India*, 6, p. 288, fig. 4, 1964. Jones, *Bull. cent. mar. Fish. Res. Inst.*, 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/169).

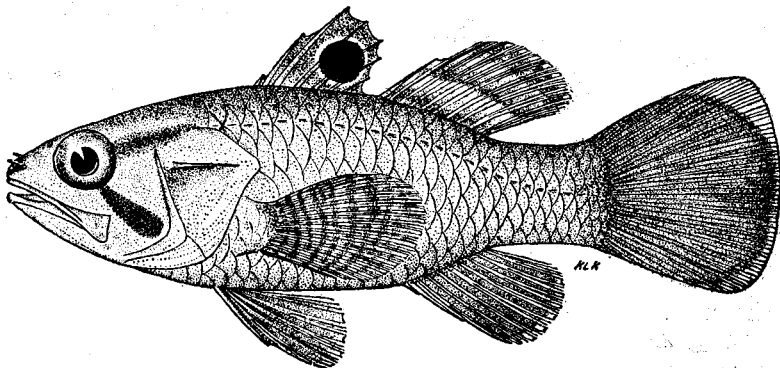


FIG. 217. *Apogonichthys ocellatus* (Weber), 23 mm. (after Jones and Kumaran)

Specimens studied: Agathi (1), 23 mm. Kadamat (1), 24 mm. Kavarathi (1), 26 mm. Kiltan (3), 18 to 30 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. i, 13; V. I, 5. Ll. 24; Ltr. 2+1+6.

Head 2.4-2.5 in standard length, 3.1-3.2 in total length. Depth of body 2.8-2.9 in standard length, 3.6-3.7 in total length. Eye 3.6-3.8 in head, 0.7 in snout and about 0.6 in interorbital space. Villiform teeth in bands in jaws and a double row of teeth on vomer. No palatine teeth. None of the opercles serrated. A long membraneous flap at front of anterior nostril. Maxilla reaching below hind border of eye. First dorsal spine short, second equal to or slightly longer than half length of third. Pectoral equal to postorbital part of head plus half eye diameter, ventral equal to or a little longer than postorbital part of head. Colour: Brown with a dark brown band from eye to angle of preopercle. A black light edged ocellus between 3rd or 4th and 7th spines of first dorsal. Second dorsal with three brownish longitudinal bands. Pectoral spotted. Caudal brownish; ventral, second dorsal and caudal with white edges.

Local name: *Poothanachala* (other islands).

Distribution: East coast of South Africa and adjacent islands, Laccadives, Indonesia, Philippines and Marshall Islands.

218. *Ostorhynchus nubilus* (Garman)

Apogon nubilus Garman, Bull., Mus. Comp. Zool., 39, p. 229, pl. 1, fig. 1, 1903.

Ostorhynchus nubilus Smith, Ichth. Bull., 22, p. 398, pl. 50, L, 1961. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 290, fig. 7, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/170).

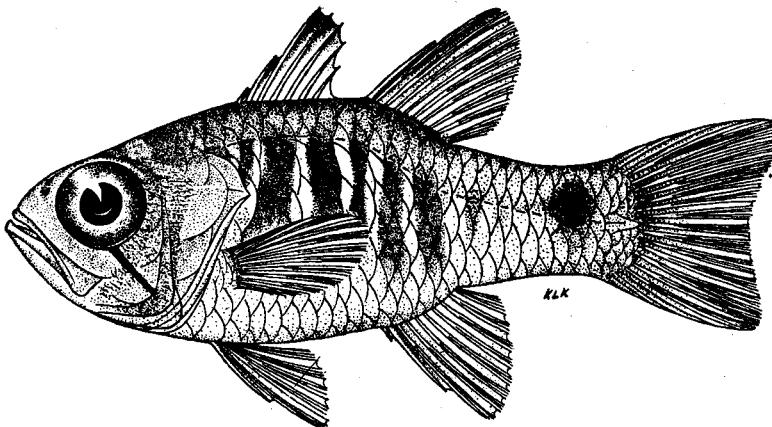


FIG. 218. *Ostorhynchus nubilus* (Garman), 70 mm. (after Jones and Kumaran)

Specimens studied: Ameni (4), 42 to 54 mm. Bangaram (8), 38 to 86 mm. Chetlat (6), 40 to 64 mm. Kalpeni (5), 29 to 66 mm. Kavarathi (4), 40 to 94 mm. Minicoy (8), 23 to 62 mm. Suheli (3), 42 to 86 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 11; V. I, 5. Ll. 23-25; Ltr. 2+1+6

Head 2.6-2.7 in standard length, 3.3-3.4 in total length. Depth of body 2.4-2.5 in standard length, 3.0-3.2 in total length. Eye 2.5-2.7 in head, 0.5 in snout and 0.8 in interorbital space. Preopercle ridge smooth, preopercle margin finely serrate. Maxilla reaching to below middle of eye. Teeth villiform in bands in jaws, in two rows on vomer and in a single row on palatines. First dorsal spine about $\frac{1}{3}$ of second, the latter equal to or slightly more than $\frac{2}{5}$ of third spine. Colour: Head and body brownish, lighter below, normally with 6-8 lighter cross bars separated by wider dusky interspaces on sides. A dark mark from below eye to angle of preopercle, its width only slightly more below the eye than at the angle of preopercle. A diffuse dark blotch over upper part of caudal peduncle continued below lateral line. Anterior half of first dorsal blackish, rest of the fin dusky or lighter. Soft dorsal pale to dusky, first few rays being generally darker. Anal and caudal dusky to lighter. Pectoral and ventral transparent.

Local names: *Kalubodi* (Minicoy). *Kodupoothan*, *Kottapoothan* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, Indonesia, Philippines and Ryukyu, Marshall, Marianas, Fiji, Phoenix and Samoan Islands.

219. *Ostorhynchus savayensis* (Günther)

Apogon savayensis Günther, Proc. Zool. Soc. London, p. 656, 1871.

Apogon bandanensis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 317, 1929 (in part). Smith, Fishes of Southern Africa, p. 207, pl. 23, fig. 482, 1949.

? *Apogon savayensis* Day, Fishes of India, p. 60, pl. 16, fig. 5, 1878.

Ostorhynchus savayensis Smith, Ichth. Bull., 22, p. 399, pl. 47, B, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/171).

Specimens studied: Agathi (2), 58 and 73 mm. Kalpeni (1), 66 mm. Kiltan (4), 34 to 75 mm. Minicoy (7), 35 to 53 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 11; V. I, 5. Ll. 24-25; Ltr. 2+1+6.

Head 2.5-2.7 in standard length, 3.2-3.4 in total length. Depth of body 2.4-2.7 in standard length, 3.1-3.4 in total length. Eye 2.4-2.6 in head, 0.5 in snout and 0.7 in interorbital space. Maxillary reaching to below or slightly behind hind border of pupil. Teeth villiform, in bands in jaws and in a single row

on palatines and in an indistinct double row on vomer. Preopercle ridge smooth; preopercle margin finely serrated. Pectoral slightly longer than ventrals, equal to postorbital part of head and $\frac{1}{2}$ eye diameter. First dorsal spine about $\frac{1}{3}$ of second; the latter being half as long as third. Colour: Brown above, light brown below. Sides of body with 6-7 narrow silvery vertical bars interspaced with wider dusky bars. A dark brown triangular mark from lower border of eye to angle or slightly above angle of preopercle ridge, its width much more below the eye than at the angle of preopercle ridge. A brownish saddle on upper part of peduncle at caudal base. Outer portion of first dorsal blackish; soft dorsal, anal and caudal pale to slightly dusky; caudal lobes often with dark intramarginal streak; ventral slightly dusky to colourless.

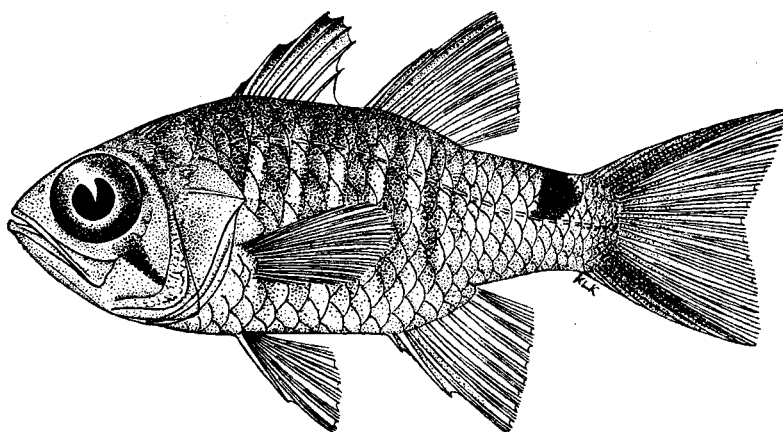


FIG. 219. *Ostorhynchus savayensis* (Günther), 75 mm.

Local names: *Kalubodi* (Minicoy). *Kodupoothan*, *Kottapoothan* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines and Marshall, Fiji, Samoan and Tuamotu Islands.

220. *Ostorhynchus quadrifasciatus* (Cuvier)

Apogon quadrifasciatus Cuvier and Valenciennes, Hist. Nat. Poissons, 2, p. 153, 1828. Day, Fishes of India, p. 59, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 300, 1929. Smith, Fishes of Southern Africa, p. 208, pl. 23, fig. 485, 1949. Munro, Fishes of Ceylon, p. 120, pl. 21, fig. 331, 1955. Jones, Proc. Symposium on Scombroid Fishes, p. 658, fig. 21, (1962) 1964.

Ostorhynchus quadrifasciatus Smith, Ichth. Bull., 22, p. 404, pl. 48, G, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/172).

Specimens studied: Kadamat (2), 59 and 64 mm. Kavarathi (3), 55 to 60 mm. Minicoy (1), 66 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 12-13; V. I, 5. Ll. 24-25; Ltr. 2+1+6½.

Head 2.5-2.8 in standard length, 3.2-3.5 in total length. Depth of body 2.7-3.0 in standard length, 3.4-3.7 in total length. Eye 3.2-3.5 in head, 0.8 in snout and about 0.7 in interorbital space. Conical teeth in 3-4 rows in jaws; vomer and palatines toothed. Preopercle margin denticulate. Maxilla reaching below posterior half of eye. Ventral shorter than pectoral. Pectoral shorter than head without snout. Colour: Yellowish brown, lighter below with silvery white

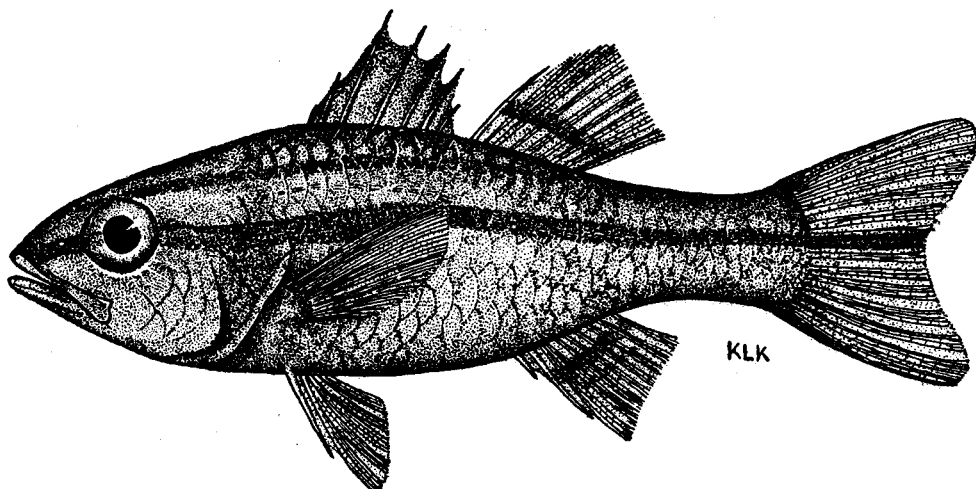


FIG. 220. *Ostorhynchus quadrifasciatus* (Cuvier), 64 mm.

reflections. Two longitudinal dark stripes on body, the first one narrow from snout, above eye, along back towards upper edge of caudal base and the second broad stripe from snout through eye over opercle, it being darker there than the rest of the stripe, and then backwards to the end of median caudal rays. Anterior part of first dorsal dusky. Second dorsal and anal each with a sub-basal brownish band. Pectoral hyaline. Upper and lower caudal rays dusky.

Local names: *Bodubodi* (Minicoy). *Poothan* (other islands).

Distribution: East coast of South Africa and Persian Gulf to the Laccadives, coasts of India, Ceylon, Philippines, Taiwan, China, Australia and Fiji.

221. *Ostorhynchus endekataenia* (Bleeker)

Apogon endekataenia Bleeker, Nat. Tijds. Ned.-Ind., 2, p. 449, 1852. Day, Fishes of India, p. 59, pl. 16, fig. 7, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 306, 1929. Munro, Fishes of Ceylon, p. 121, pl. 21, fig. 333, 1955. *Apogon novemfasciatus* Smith, Fishes of Southern Africa, p. 208, pl. 22, fig. 487, 1949 (not of Cuvier and Valenciennes).

Ostorhynchus endekataenia Smith, Ichth. Bull. 22, p. 399, pl. 46, I and pl. 47, E, 1961.
Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F.
84/173).

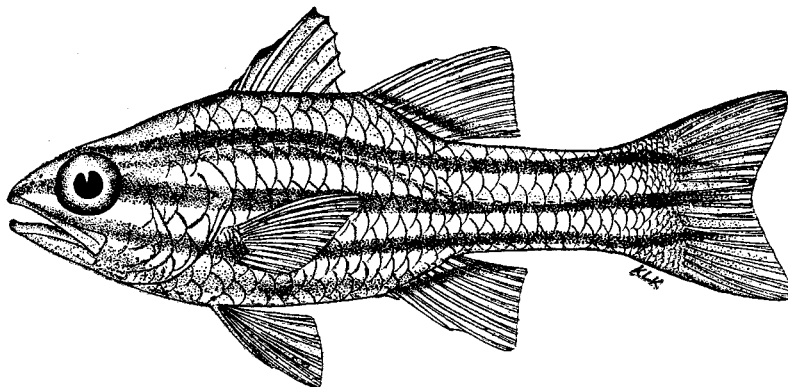


FIG. 221. *Ostorhynchus endekataenia* (Bleeker), 78 mm.

Specimens studied: Agathi (26), 27 to 88 mm. Ameni (16), 34 to 73 mm. Androth (4), 40 to 50 mm. Bangaram (4), 72 to 83 mm. Bitra (33), 34 to 55 mm. Chetlat (9), 28 to 85 mm. Kadamat (4), 51 to 65 mm. Kalpeni (5), 38 to 58 mm. Kavarathi (11), 27 to 74 mm. Kiltan (33), 34 to 68 mm. Minicoy (29), 17 to 78 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 12; V. I, 5. Ll. 24-26; Ltr. 2+1+ 6½.

Head 2.5-2.8 in standard length, 3.2-3.6 in total length. Depth of body 2.7-2.9 in standard length, 3.4-3.7 in total length. Eye 3.1-3.3 in head, 0.7 in snout and also in interorbital space. Maxilla reaching to below hind margin of pupil or beyond. Preopercle ridge smooth, hind margin of preopercle finely serrated. Preorbital height about $\frac{1}{3}$ eye diameter. Pectoral shorter than head without snout. Ventral slightly shorter than pectoral. Colour: Pale brownish, yellowish below with six dark brown longitudinal stripes. The first stripe from interorbital region backwards, dividing at origin of spinous dorsal and uniting at the end of base of soft dorsal and extending as far as the dorsal side of caudal peduncle. The second stripe from snout passing above eye backwards to upper portion of midbase of caudal and downwards to the fork. The third stripe, rather indistinct from postorbital part of eye along the ventral edge of lateral line, curving down towards the fourth stripe. The fourth median stripe from snout through eye to base of caudal, being darker there and narrowing to the caudal rays. The fifth from middle of upper jaw, below eye, through pectoral base to caudal base and upwards to the fork. A diffuse stripe from lower jaw to the end of base of anal fin. First dorsal dusky; second dorsal and anal pale with dark basal stripes. Ventral dusky. Pectoral transparent, its base brownish.

Local names: *Rung-bodi* (Minicoy). *Kottapoothan* (other islands).

Distribution: Red Sea and coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Australia and New Hebrides and Fiji Islands.

222. *Ostorhynchus novemfasciatus* (Cuvier)

Apogon novemfasciatus Cuvier and Valenciennes, Hist. Nat. Poissons, 2, p. 154, 1828.

Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 302, 1929 (in part). Munro, Fishes of Ceylon, p. 121, pl. 21, fig. 332, 1955.

? *Apogon fasciatus* Day, Fishes of India, p. 60, 1878.

Ostorhynchus novemfasciatus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/174).

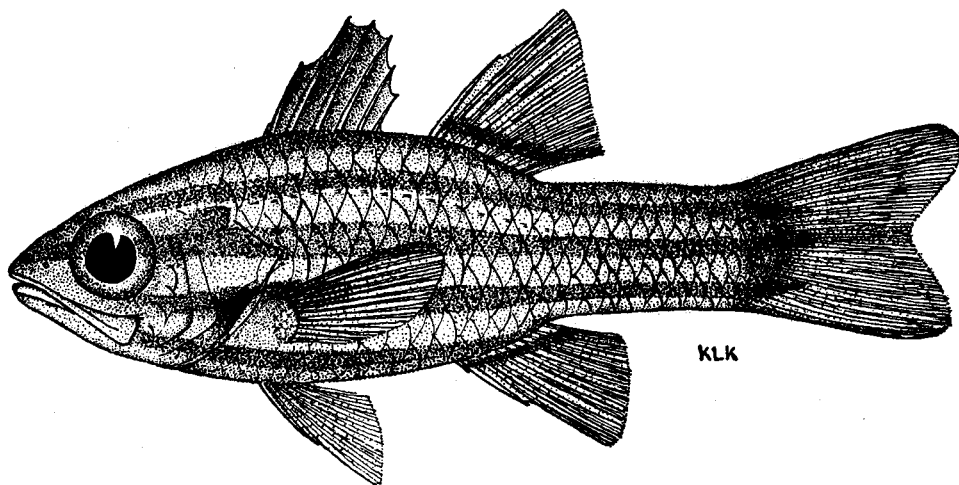


FIG. 222. *Ostorhynchus novemfasciatus* (Cuvier), 49 mm.

Specimens studied: Minicoy (4), 41 to 49 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 12; V. I, 5. Ll. 24-25; Ltr. 2+1+6½.

Head 2.6-2.7 in standard length, 3.1-3.3 in total length. Depth of body 2.7-2.8 in standard length, 3.4-3.6 in total length. Eye 2.8-3.0 in head, 0.6-0.7 in snout and 0.6 in interorbital space. Maxillary reaching to below hind border of pupil. Preorbital height $\frac{1}{4}$ eye diameter. Preoperculum serrated. Pectoral equal to postorbital length of head with $\frac{3}{8}$ eye diameter. Ventral shorter. Colour: Pale brownish, yellowish below with 5 dark stripes along sides; the first from between eyes, along side of bases of dorsal fins; second from snout, above eye along upper edge of lateral line and to caudal base; third stripe from snout through eye, along middle of side to caudal base; the fourth from below eye through base of pectoral to lower edge of caudal base and the fifth from chest ending above end of base of anal; the middle 3 bands may extend to the caudal

fin where they are indistinct. First dorsal slightly dusky, other fins pale, dorsal and anal with dark basal stripes.

Local Name: *Rung-bodi* (Minicoy).

Distribution: East coast of Africa to the Laccadives, Ceylon, Indonesia, Philippines and Gilbert, Samoan and Society Islands.

223. *Ostorhynchus apogonides* (Bleeker)

Cheilodipterus apogonides Bleeker, Acta Soc. Sci. Indo-Neerl., 1, p. 37, 1856.

Apogon apogonides Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 324, 1929.

Ostorhynchus apogonides Smith, Ichth. Bull., 22, p. 402, pl. 48, 1, 1961. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 289, fig. 5, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/175).

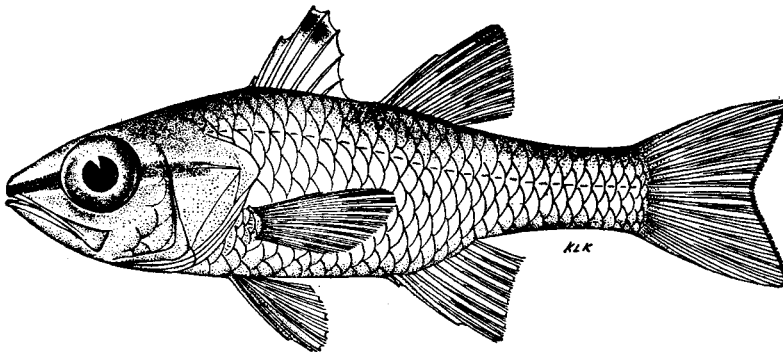


FIG. 223. *Ostorhynchus apogonides* (Bleeker), 40 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (6), 39 to 43 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 12; V. I, 5. Ll. 26-27; Ltr. 2+1+6.

Head 2.4-2.6 in standard length, 3.0-3.2 in total length. Depth of body 3.0-3.2 in standard length, 3.8-4.1 in total length. Eye 3.1-3.3 in head, 0.7 in snout and 0.6-0.7 in interorbital space. Maxillary reaching below hind border of pupil. Teeth in jaws in several rows, outer row caninoid, teeth in narrow bands on vomer and palatines. Preopercle ridge smooth, hind margin of preopercle denticulated. First dorsal spine minute, second half length of third. Pectoral equal to postorbital part of head and half eye diameter, ventral slightly shorter. Colour: Brownish, paler to whitish below with an ill defined brown band from snout to eye and generally continued posterior to eye. First dorsal blackish brown above, other fins pale yellowish, hind border of caudal dusky.

Local name: *Bodi* (Minicoy).

Distribution: East coast of Africa, Zanzibar, Seychelles, Laccadives and Indonesia.

224. *Ostorhynchus moluccensis* (Valenciennes)

Apogon moluccensis Valenciennes, Nouv. Arch. Mus. Hist. Nat., Paris, **1**, p. 54, 1832.

Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **5**, p. 322, 1929.

Ostorhynchus moluccensis Jones and Kumaran, J. Mar. biol. Ass. India, **6**, p. 290, fig. 6, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/176).

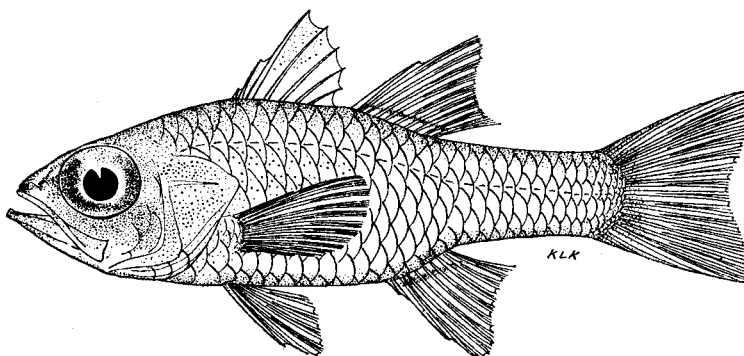


FIG. 224. *Ostorhynchus moluccensis* (Valenciennes), 42 mm. (after Jones and Kumaran)

Specimens studied: Agathi (5), 34 to 45 mm. Ameni (22), 20 to 42 mm. Bitra (4), 31 to 38 mm. Chetlat (4), 35 to 46 mm. Kalpeni (75), 15 to 54 mm. Kiltan (4), 15 to 25 mm.

D₁. VII; D₂. I, 9; A. II, 8; P. ii, 11-12; V. I, 5. Ll. 25-26; Ltr. 2 + 1 + 6

Head 2.6-2.7 in standard length, 3.3-3.4 in total length. Depth of body 2.8-3.1 in standard length, 3.6-3.9 in total length. Eye 2.7-2.8 in head, 0.6 in snout and also in interorbital space. Maxillary reaching almost to below hind edge of pupil. Teeth in a few rows in jaws, outer row slightly enlarged; a narrow band of teeth on vomer and palatines. Preopercular margin finely serrated. First dorsal spine minute, second less than half length of third. Pectoral equal to or slightly exceeding postorbital part of head and half eye diameter. Ventral shorter. Colour: Head and upper sides light brownish, pale yellowish below. Head and anterior part of body with numerous dark brown spots. Fins yellowish, some specimens with an indistinct sub-basal band for second dorsal and anal.

Local name: *Donbodi* (Minicoy). *Poothan* (other islands).

Distribution: Natal, Laccadives, Malaysia, Indonesia, Philippines, coast of China and Fiji Islands.

225. *Gymnapogon africanus* Smith

Gymnapogon africanus Smith, Ann. Mag. Nat. Hist., (12) 7, p. 775, 1954. Ichth. Bull., 22, p. 411, fig. 10, 1961. Smith and Smith, Fishes of Seychelles, p. 18. pl. 16, fig. G, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 190, fig. 1g, 1970.

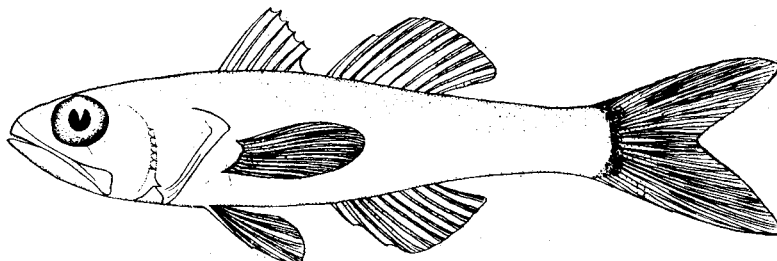


FIG. 225. *Gymnapogon africanus* Smith, 31 mm. (after Jones and Kumaran)

Specimen studied: Kavarathi (1), 31 mm.

D₁. VI; D₂. I, 9; A. II, 9; P. 14; V. I, 5.

Head 2.5 in standard length, 3.3 in total length. Depth of body 3.8 in standard length, 4.9 in total length. Eye 3.4 in head, 0.8 in snout and 0.9 in interorbital space. Maxillary reaching a vertical through posterior margin of eye. Preoperculum with a stout triangular spine at posterior margin and a transparent preopercular flap below the spine. Minute papillae present on top of head, lower jaw, cheek, opercles and sides of body. Teeth small in a single series in posterior three fourths of upper jaw, 3 canines on each side anteriorly in upper jaw, 2 canines on each side of symphysis of lower jaw and 4 recurved canine teeth along middle half of lower jaw on each side and a single row of villiform teeth posteriorly. Vomer with one caninoid tooth and palatines with four or five small teeth. Body completely scaleless. Lateral line not evident. Pectoral equal to head without snout. Ventral equal to postorbital part of head. Caudal forked. Colour: Uniform light tan; tip of snout, chin and occiput with some pigmentation. Fins transparent; two dark marks at base of caudal fin.

Note: *Gymnapogon urospilotus* Lachner (Bull. U.S. Nat. Mus., 202, 1, p. 493, 1953) is closely allied to this species.

Distribution: ~~Previously known~~ from Bazaruto, Mozambique and Seychelles in the Western Indian Ocean and the Laccadives.

226. *Pseudamia gelatinosa* Smith

Pseudamia polystigma Smith, Ann. Mag. Nat. Hist., (12) 7, p. 778, pl. 23, D and E, 1954 (not of Bleeker).

Pseudamia gelatinosa Smith, Ann. Mag. Nat. Hist., (12) 8, p. 690. pl. 18, A, 1955. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 292, fig. 9, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/177).

Specimen studied: Minicoy (1), 43 mm.

D₁. VI; D₂. I, 8; A. II, 8; P. ii, 14; V. I, 5. Llat. 41; Ltr. 3+1+14.

Head 2.6 in standard length, 3.3 in total length. Depth of body 4.1 in standard length, 5.3 in total length. Eye 4 in head, equal to snout and 0.8 in interorbital space. Maxillary reaching to below hind border of eye. Two or three series of fine teeth in jaws, one long inwardly directed canine on each side near symphysis in upper jaw and a pair of recurved canines on either side in lower jaw, the anterior one being a little shorter than the other. Teeth on vomer, palatines and pterygoid. None of the opercles serrated. Operculum and nape scaled. Lateral line with 20 scales, ending below second dorsal. Anterior nostril with a large flap posteriorly. Pectoral equal to postorbital length of head and half eye diameter. Ventral less than postorbital length of head. First dorsal spine shorter than second spine. Second dorsal and anal higher than first dorsal. Colour: Yellowish, with small dark spots on head; scales of body with small dark spots forming a series of somewhat longitudinal lines and larger spots irregularly arranged. A dark blotch at caudal peduncle near base of upper caudal rays. Spinous dorsal slightly dusky. Second dorsal, anal and caudal with dark specks. A diffuse dark blotch midway on upper side of caudal. Pectoral and ventral yellowish.

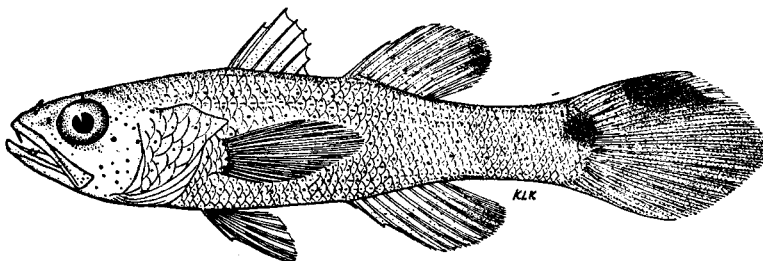


FIG. 226. *Pseudamia gelatinosa* Smith, 43 mm. (after Jones and Kumaran)

Distribution: Bazaruto northwards to Malindi and Seychelles in the Western Indian Ocean and the Laccadives.

Note: Smith (Ann. Mag. Nat Hist., 1955 (12) 8: 690-91) has drawn attention to the probability of the species being identical with *Pseudamia amblyuropterus* Bleeker on the basis of similarities in colouration and distinguishes *P. polystigma* and *P. gelatinosa* mainly on account of the difference in gill raker counts (2+1+8 for *polystigma* and 1+1+6 for *gelatinosa*) and the slight difference in colouration. The specimen obtained from Minicoy has a gill raker count of 1+1+6 and agrees in all essential features with the material from the east coast of Africa.

227. *Paramia quinquelineata* (Cuvier)

Cheilodipterus quinquelineatus Cuvier and Valenciennes, Hist. Nat. Poissons, 2, p. 167, 1829. Day, Fishes of India, p. 66, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 361, 1929. Smith, Fishes of Southern Africa, p. 205, 1949. Munro, Fishes of Ceylon, p. 119, pl. 21, fig. 324, 1955.

Paramia quinquelineata Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/178).

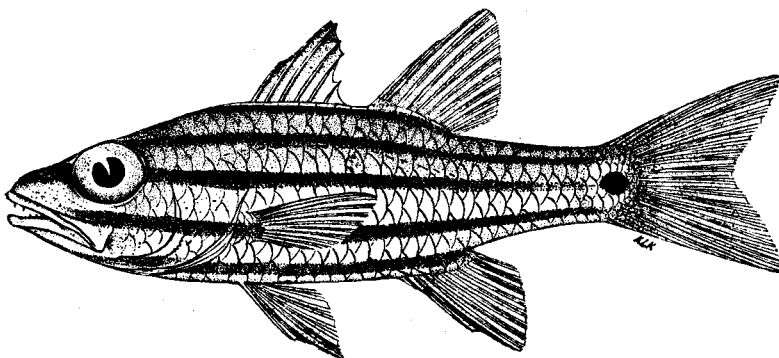


FIG. 227. *Paramia quinquelineata* (Cuvier), 77 mm.

Specimens studied: Chetlat (5), 30 to 45 mm. Kavarathi (5), 30 to 75 mm. Kiltan (4), 38 to 81 mm. Minicoy (5), 35 to 70 mm.

D₁. VI; D₂. I, 9; A. II, 8; P. ii, 10; V. I, 5. Ll. 25-26; Ltr. 2+1+6½.

Head 2.4-2.6 in standard length, 3.1-3.5 in total length. Depth of body 3.3-3.5 in standard length, 4.2-4.5 in total length. Eye diameter 3.1-3.4 in head, 0.9-1.1 in snout and about 0.7 in interorbital space. Maxillary reaching below behind middle of eye. Jaws with narrow bands of villiform teeth, two moderate canines on either side on upper jaw and three or four lateral canines in lower jaw. Vomer and palatines with small teeth. Preopercle edge finely serrated. Pectoral equal to snout and eye together; ventral equal to or slightly shorter than pectoral. Colour: Dull yellowish with five longitudinal dark bands on sides and a sixth median band from isthmus to vent. The lateral band from snout through eye ending in a black yellow edged spot on caudal base. Front border of spinous dorsal blackish, soft dorsal, anal and caudal more or less pale to dusky, pectoral and ventral yellowish.

Local names: *Rung-bodi* (Minicoy). *Poothanachala* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Marshall, Samoan, Phoenix and Society Islands.

228. *Cheilodipterus lachneri* Klausewitz

Cheilodipterus lachneri Klausewitz, Sencken Mus., 40, p. 260, fig. 11, 1959. Smith, Ichth. Bull., 22, p. 408, pl. 50, B and C, 1961. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 3, fig. 3, 1967. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 12, 1969 (Cat. No. CMFRI-LA-F. 84/179).

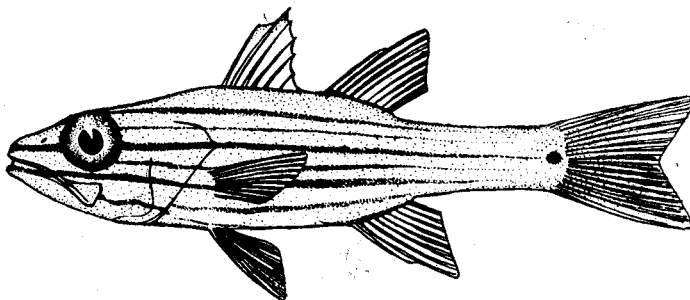


FIG. 228. *Cheilodipterus lachneri* Klausewitz, 53 mm. (after Jones and Kumaran)

Specimens studied: Kavarathi (3), 26 to 53 mm.

D₁. VI; D₂. I, 9; A. II, 8; P. ii, 10-11; V. I, 5. Ll. 24; Ltr. 2+1+6.

Head 2.6-2.7 in standard length, 3.3-3.4 in total length. Depth of body 3.6-3.7 in standard length, 4.6-4.7 in total length. Eye 3.0-3.3 in head, 0.7 in snout and also in interorbital space. Maxilla reaching to below hind border of iris. Upper jaw with villiform teeth in front and 3 canines on each side. Lower jaw with 2 canines on each side; no villiform teeth in front. Vomer and palatines with a narrow band of teeth. First spine of dorsal more than half length of second which is longest. Pectoral equal to or slightly longer than snout and eye together. Ventral shorter than pectoral. Colour: Yellowish with 8 dark brown lengthwise stripes on sides, the intermediate stripes narrower and a dark brown spot larger than iris at base of caudal. Fins yellowish; front of spinous dorsal and upper and lower edges of caudal slightly dusky.

Local name: *Poothan* (Kavarathi).

Distribution: Known only from the Red Sea, Inhaca and Wamizi Islands and Bioxo Pinda in Mozambique and Laccadives in the Central Indian Ocean.

Family MALACANTHIDAE

Body elongate, head somewhat conical. Mouth protractile, lips thick; maxillary exposed posteriorly. Teeth in villiform bands anteriorly, lateral teeth enlarged; vomer and palatines edentulous. Preoperculum generally entire; operculum with a flat spine. Dorsal fin long, anterior part with a few weak spines.

Anal long with one or two weak spines. Gill membranes united, free or attached to isthmus. Scales small, ctenoid. Lateral line continuous, anterior part convexly curved.

229. *Malacanthus latovittatus* (Lacépède)

Labrus latovittatus Lacépède, Hist. Nat. Poissons, 3, p. 527, pl. 28, fig. 2, 1802.

Malacanthus latovittatus Day, Fishes of India, Suppl., p. 787, 1888. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 551, fig. 105, 1936. Smith, Fishes of Southern Africa, p. 179, pl. 13, fig. 384, 1949. Munro, Fishes of Ceylon, p. 122, pl. 21, fig. 336, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 88/180).

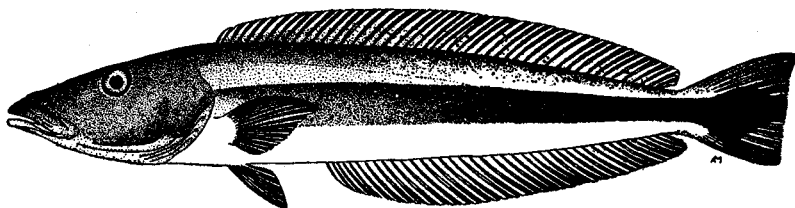


FIG. 229. *Malacanthus latovittatus* (Lacépède), 318 mm.

Specimens studied: Bitra (2), 257 and 318 mm. Minicoy (1), 335 mm.

D. 49-50; A. 39-40; V. I, 5. LI. 126-128; Ltr. 12+1+34-36.

Elongate, almost cylindrical. Head 3.4-3.6 in standard length, 3.8-4.1 in total length. Depth of body 5.5-5.8 in standard length, 6.2-6.6 in total length. Pectoral equal to or longer than snout. Ventral much shorter than snout. Teeth in bands in jaws. Eye 6.6-6.8 in head, 3.0-3.2 in snout and 2.0-2.2 in interorbital space. Head and back dark bluish, lower sides pale yellowish. A black lateral band from operculum to end of caudal with a branch to lower part of caudal. Dorsal pale grey with yellowish outer border. Pectoral grey. Ventral and anal white.

Local name: *Nuhikkae* (Minicoy).

Distribution: Tropical Indo-Pacific from the east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, eastwards to Palau Islands.

Family CARANGIDAE

Body oblong, elevated, slightly or strongly compressed. Mouth moderate; teeth usually minute, in a single series or in villiform bands sometimes present on vomer, palatines, pterygoids and tongue. Gill openings wide, gill membranes

not usually united and free from isthmus. Usually seven branchiostegals; pseudobranchiae present or absent. Two dorsal fins, a procumbent spine before the first dorsal often present. Two detached spines before anal fin. Detached finlets sometimes present behind second dorsal and anal. Scales small, cycloid or sometimes naked; lateral line complete, scales of lateral line sometimes enlarged and spiny.

1. Lateral line with large scutes at least posteriorly 2
Lateral line without scutes 12
2. One finlet behind soft dorsal and anal *Decapterus russelli*
Dorsal and anal without distinct finlets 3
3. VI rudimentary dorsal spines, unconnected by membrane; lateral line scutes feeble; anterior dorsal and anal rays filiform, at least equalling body length *Alectis ciliaris*
VII or VIII well developed dorsal spines, connected by membrane; anterior dorsal and anal rays not equalling body length 4
4. Upper jaw, vomer and palatines without teeth. Minute teeth in a single row in lower jaw and rudimentary teeth on tongue. Grey on back, yellowish below with a broad golden band from eye to caudal base; a black spot at upper edge of gill opening *Caranx leptolepis*
Teeth present in both jaws, vomer and palatines 5
5. Teeth uniserial in jaws; breast completely scaled. Lateral line scarcely arched *Caranx crumenophthalmus*
Teeth not uniserial; breast sometimes naked ventrally 6
6. Pleuriseriate band of minute teeth at least anteriorly in jaws. Breast naked at least ventrally; anterior part of lateral line with low arch 7
Villiform band of teeth in upper jaw; outer series enlarged. Breast scaled or median line partly naked. A series of conical teeth in lower jaw. Anterior part of lateral line strongly arched 8
7. Median line of breast naked. Not more than 24 branched rays in second dorsal. Curved part of lateral line about twice longer than straight part. Depth 3.3 in length. 31-32 scutes *Caranx compressus*
Breast naked, naked area slightly widening anteriorly. Not less than 23 branched rays in second dorsal. Anterior rays of dorsal and anal falcate. Depth 2.5-2.8 in length. 26-27 scutes *Caranx ferdau*
8. Breast naked except for a median patch of scales before ventrals. D₂. I, 20; A. II, I, 16-17 *Caranx ignobilis*
Breast completely scaled 9
9. 36-38 scutes. D₂. I, 22-23; A. II, I, 18-19. GR. 7-8+1+17-19 *Caranx melampygus*
30-35 scutes 10

10. Bluish with dusky tinge above becoming silvery white below; scattered blackish spots on head and body. 32-35 scutes. D₂. I, 23; A. II, I, 19. GR. 5+1+16-17 *Caranx stellatus*
No blackish spots on head and body as above 11
11. Depth 2.3 in length. D₂. I, 22; A. II, I, 18. GR. 6+1+19. Scutes 31-32. Dark brown on sides of head and body, slightly lighter below. Spinous dorsal blackish *Caranx lugubris*
Depth 2.6-3.6 in length. D₂. I, 19-21; A. II, I, 15-17. GR. 6-7+1+15-17. Scutes 30-33. Light brownish above, lighter below. Spinous dorsal dusky distally *Caranx sexfasciatus*
12. Base of anal much shorter than that of dorsal. Pectorals falcate. A finlet present or absent 13
Base of dorsal and anal of almost equal length. Pectoral not falcate 14
13. A finlet with two rays behind dorsal and anal. D₂. I, 24-26+2; A. II, I, 15-17+2; P. ii, 17-18. Back dark greyish to greenish grey, dirty yellowish below with two bluish lateral bands *Elagatis bipinnulatus*
No finlets behind dorsal and anal. D₂. I, 26-28; A. II, I, 16-18. Dorsal spines short and free. Greyish above, lighter below with 6-7 dark cross bars on sides *Naucrates ductor*
14. Dorsal and anal finlets present. Scales lanceolate or needle-like 15
No finlets; scales minute, rounded 16
15. Scales lanceolate. Maxillary reaching to or beyond vertical from hind border of eye. Depth 4.0-4.3 in length. About 8 dark blotches on sides above lateral line and 5-6 dark blotches just below lateral line; anterior rays of dorsal with a dark blotch distally *Scomberoides sancti-petri*
Scales needle-shaped. Maxillary reaching to below hind border of pupil. Depth 4.3-4.5 in length. 7-8 vertically oblong blackish blotches on sides, the anterior 3-4 on the lateral line and others above lateral line; anterior rays of dorsal dusky distally *Scomberoides tol*
16. Depth 1.7-1.9 in length. No spots on sides of body *Trachinotus blochi*
Depth 2.1-2.4 in length; 3-5 round black spots on lateral line *Trachinotus bailloni*

230. *Decapterus russelli* (Rüppell)

Caranx russellii Rüppell, Atlas Reise Nordle. Afrika, Fische Rothen Meeres, p. 99, 1828.

Caranx kurra Day, Fishes of India, p. 214, pl. 48, fig. 5, 1878.

Decapterus russelli Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 196, fig. 41, 1931. Smith, Fishes of Southern Africa, p. 220, 1949. Munro, Fishes of Ceylon, p. 124, pl. 23, fig. 339, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/516).

Specimens studied: Kavarathi (1), 187 mm. Minicoy (1), 135 mm.

D₁. I, VIII; D₂. I, 31-32+1; A. II, I, 25-26+1; P. ii, 20; V. I, 5. GR. 9+1+26.

Elongate, somewhat compressed. Head 3.6-3.8 in standard length, 4.1-4.5 in total length. Eye 4.2-4.3 in head, 1.3 in snout and equal to or slightly less than interorbital space. Lower jaw slightly longer than the upper. Maxillary almost reaching to below front border of eye. Teeth in a single row in jaws, some teeth on vomer and palatines. Pectoral shorter than head without snout. Ventral shorter than postorbital part of head. Straight part of lateral line with 40 scutes. Colour: Greenish blue above becoming silvery below. A black opercular spot present. Fins pale yellowish.

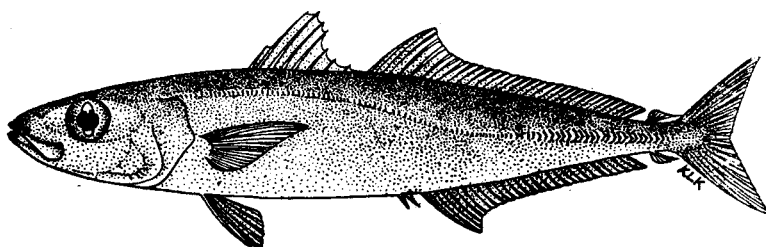


FIG. 230. *Decapterus russelli* (Rüppell), 135 mm.

Local name: *Murimas* (Minicoy).

Distribution: East coast of Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Ryukyu Islands, Japan and Australia.

231. *Alectis ciliaris* (Bloch)

Zeus ciliaris Bloch, Naturges. Ausland. Fische, 6, p. 29, pl. 191, 1787.

Alectis ciliaris Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 269, 1931. Smith, Fishes of Southern Africa, p. 219, pl. 24, fig. 527, 1949. Munro, Fishes of Ceylon, p. 125, pl. 22, fig. 340, 1955. Jones, Bull. cent. mar. Fish. Rés. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/517).

Specimens studied: Kavarathi (2), 200 and 238 mm. Minicoy (1), 330 mm.

D₁. VI; D₂. I, 19-20; A. II, I, 16; V. I, 5. GR. 5+1+13-14.

Head and body much compressed, rhomboidal. Head 3.0-3.1 in standard length, 3.7-3.8 in total length. Depth of body 1.7-1.8 in standard length, 2.0-2.2 in total length. Eye 3.6-3.8 in head, 1.1-1.2 in snout and 1.4-1.5 in highly convex interorbital space. Rostro-dorsal profile steep upto the level of eye and then descending in an oblique line to the dorsal. Height of preorbital slightly

less than eye. Anterior rays of soft dorsal and anal prolonged and filamentous. Maxillary extending slightly behind front border of pupil. Anterior part of lateral line arched, becoming straight below about 10th dorsal ray; the straight part equal to curved part with 15 scutes. 6-7 anterior rays of soft dorsal and anterior four rays of anal produced into long filaments. Spines of first dorsal and detached spines before anal concealed. Pectorals falcate, longer than head. Ventrals equal to snout and eye together. Colour: Bluish above, silvery white on sides and below. Membranes between third and eighth dorsal rays black basally.

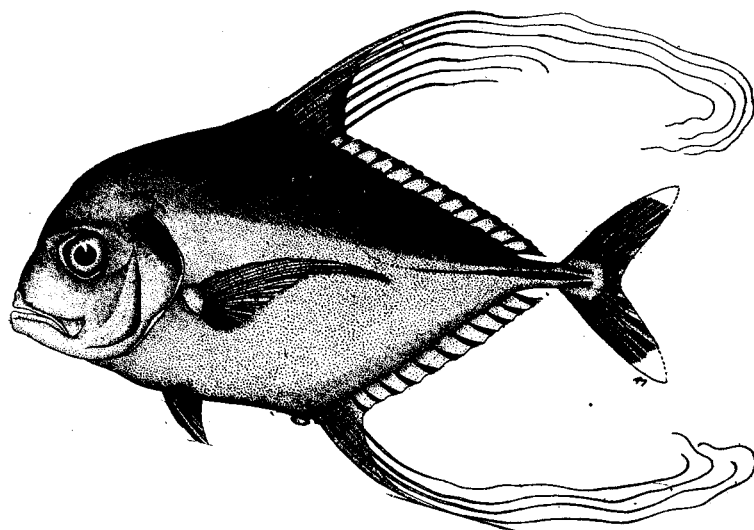


FIG. 231. *Alectis ciliaris* (Bloch), 330 mm.

Local name: *Agori* (Kavarathi).

Distribution: Widely distributed from the east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Australia and Marshall, Gilbert, Society, Kingsmill and Hawaiian Islands.

232. *Caranx leptolepis* Cuvier

Caranx leptolepis Hist. Nat. Poissons, 9, p. 63, 1833. Day, Fishes of India, p. 225, pl. 51, fig. 4, 1878. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/181).

Caranx (*Selaroides*) *leptolepis* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 262, fig. 49, 1931.

Selaroides leptolepis Munro, Fishes of Ceylon, p. 125, pl. 23, fig. 343, 1955.

Specimen studied: Bitra (1), 106 mm.

D₁. VIII; D₂. I, 24; A. II, I, 20; P. ii, 17; V. I, 5. Ll. 94. GR. 12+1+29.

Head 3.4 in standard length, 4.2 in total length. Depth of body 3.3 in standard length, 4.1 in total length. Eye with a broad posterior and a narrow anterior adipose eyelid, eye diameter 3.4 in head, equal to snout and also interorbital space. Maxillary reaching below front border of eye. A single row of fine teeth in lower jaw, teeth rudimentary on tongue; upper jaw, vomer and palatines without teeth. Lateral line with a very low arch, curved portion 1½ times of straight portion having 28 feeble scutes. Pectoral falcate, slightly longer than head. Colour: Grey on back, yellowish below with a broad golden band from eye to base of caudal and a black spot at upper edge of gill opening. Fins pale yellowish.

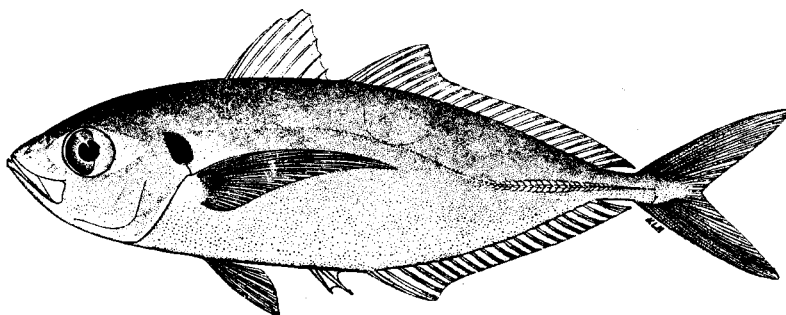


FIG. 232. *Caranx leptolepis* Cuvier, 106 mm.

Local name: *Bangada* (Bitra).

Distribution: Arabia, Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, China, Taiwan, Ryukyu Islands and Australia.

233. *Caranx crumenophthalmus* (Bloch)

Scomber crumenophthalmus Bloch, Naturges. Ausland. Fische, 7, p. 77, pl. 343, 1793.
Caranx crumenophthalmus Day, Fishes of India, p. 217, pl. 49, fig. 1, 1878. Smith, Fishes of Southern Africa, p. 214, fig. 503, 1949. Smith and Smith, Fishes of Seychelles, p. 22, pl. 10, I, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/182).

Caranx (Selar) crumenophthalmus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 210, 1931.

Selar crumenophthalmus Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958.

Specimens studied: Agathi (5), 81 to 187 mm. Ameni (3), 85 to 117 mm. Bangaram (1), 125 mm. Chetlat (5), 149 to 186 mm. Kalpeni (4), 102 to 120 mm. Minicoy (16), 82 to 164 mm.

D₁. VIII; D₂. I, 25-27; A. II, I, 21-23; P. ii, 19-20; V. I, 5. Ll. 84-90. GR. 8-10+1+ 27-28.

Head 3.1-3.3 in standard length, 3.7-4.0 in total length. Depth of body 3.6-3.9 in standard length, 4.4-4.7 in total length. Eye with broad posterior and anterior adipose lid, its diameter 3.2-3.5 in head, equal to or slightly more than pointed snout and 0.7-0.8 in interorbital space. Maxillary reaching to below anterior third of eye. A single series of fine teeth in the jaws, teeth present on vomer, palatines and tongue. Lateral line with very low arch anteriorly, the curved portion as long as the straight portion, keeled scutes 34-38 beginning below about middle of soft dorsal. Third and fourth dorsal spines longest, less than half length of head. Pectoral about half length of snout shorter than head. Colour: Top of head and back brownish to bluish grey becoming silvery white with yellowish tinge on lower sides; tip of snout, tip of lower jaw and dorsal edge of operculum dark. Spinous dorsal slightly dusky anteriorly; caudal pale, outer rays slightly dusky; anal, pectoral and pelvic fins pale.

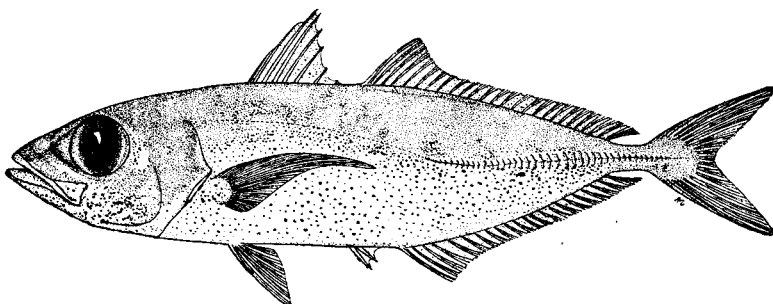


FIG. 233. *Caranx crumenophthalmus* (Bloch), 175 mm.

Local name: *Murimas* (Minicoy). *Bangada* (other islands).

Distribution: Circumtropical.

234. *Caranx compressus* Day

Caranx compressus Day, Proc. Zool. Soc. London, p. 689, 1870. Fishes of India, p. 221, pl. 50, fig. 1, 1878. Smith, Fishes of Southern Africa, p. 216, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/183).

Caranx (*Carangoides*) *compressus* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 223, 1931.

Specimen studied: Kadamat (1), 355 mm.

D₁. VIII; D₂. I, 24; A. II, I, 19; P. ii. 19; V. I, 5. Ll. 145; GR. 5+1+27.

Head 3.6 in standard length, 4.5 in total length. Depth of body 3.3 in standard length, 4.1 in total length. Eye 4 in head, 1.3 in snout and about 1.2 in interorbital space. Maxillary extending behind a level from the front border of eye. Lower jaw slightly projecting beyond the upper. Teeth small, in narrow

bands in jaws; teeth present on vomer, palatines and tongue. Breast completely scaly except median line. Anterior part of lateral line slightly arched, about twice longer than posterior straight part commencing below behind middle of soft dorsal and having 14 scutes posteriorly. Anterior rays of soft dorsal and anal slightly produced. Pectoral falcate, about $1\frac{1}{2}$ length of head. Colour: Bluish grey above, becoming silvery white below; margin of opercle and preopercle dark. Fins pale yellowish.

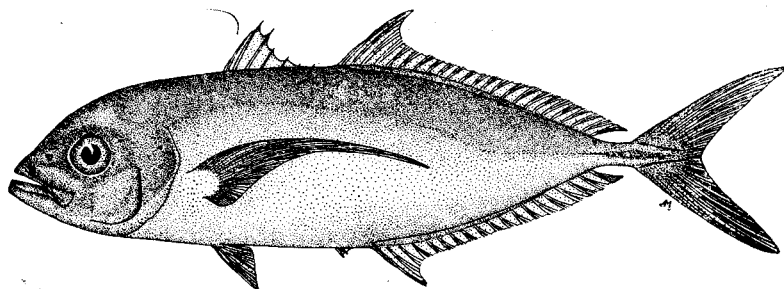


FIG. 234. *Caranx compressus* Day, 355 mm.

Local name: *Kuluvel* (Kadamat).

Distribution: Red Sea and Durban to the Laccadives, Andamans, Indonesia, Philippines, Ryukyu Islands, Japan and Australia.

235. *Caranx ferdau* (Forsk.)

Scomber ferdau Forskal, Descript. Animal., p. 55, 1775.

Carangoides ferdau Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959.

Caranx ferdau Day, Fishes of India, p. 217, 1878. Smith and Smith, Fishes of Seychelles, p. 20, pl. 10, C, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/184).

Caranx (Carangoides) ferdau Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 228, 1931.

Specimens studied: Bitra (1), 290 mm. Kadamat (1), 212 mm. Kiltan (1), 415 mm. Minicoy (2), 157 and 255 mm.

D₁. VII; D₂. I, 29-31; A. II, I, 24-25; P. ii, 19-21; V. I, 5. LI. 137-140. GR. 6+1+20-21.

Head 3.3-3.5 in standard length, 4.3-4.5 in total length. Depth of body 2.5-2.8 in standard length, 3.2-3.5 in total length. Eye with narrow posterior adipose lid, eye diameter 4.4-4.9 in head, 1.5-1.7 in snout and about 1.4-1.6 in interorbital space. Maxillary reaching below anterior third of eye. Teeth in bands in both jaws, teeth on vomer, palatines and tongue. Breast naked, naked area slightly widening anteriorly. Lateral line with a long low curve upto below

middle of soft dorsal and continued straight posteriorly with 26-27 scutes. Soft dorsal with anterior rays forming a falcate lobe, longer than head. Anterior rays of soft anal falcate, slightly longer than half length of soft dorsal lobe. Colour: Dusky grey above, yellowish white below. Soft dorsal pale yellowish with the lobe and margin dusky; anal pale yellowish, rays slightly dusky; caudal brownish with narrow dark posterior margin; pectoral and ventral pale yellowish, ventral rays sometimes slightly dusky distally.

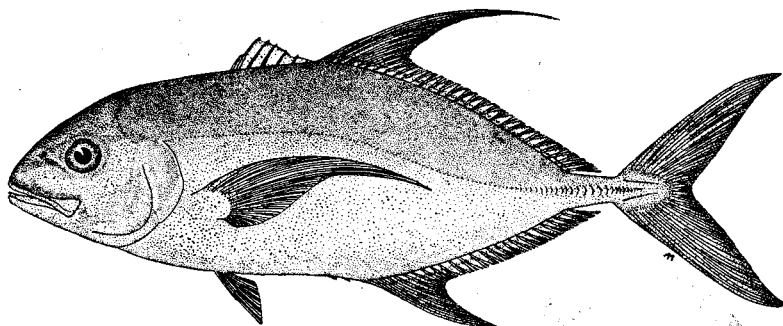


FIG. 235. *Caranx ferdau* (Forsk.), 290 mm.

Local names: *Fanihandi* (Minicoy). *Kuluvel* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Japan and Marshall, Bonin, Samoan, Society, Tuamotu and Hawaiian Islands and New South Wales.

236. *Caranx ignobilis* (Forsk.)

Scomber ignobilis Forskal, Descript. Animal., p. 55, 1775.

Caranx ignobilis Smith, Fishes of Southern Africa, p. 217, fig. 520, 1949. Munro, Fishes of Ceylon, p. 129, pl. 22, fig. 360, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Smith and Smith, Fishes of Seychelles, p. 20, pl. 11, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/185).

Caranx (Caranx) ignobilis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 255, 1931.

Specimens studied: Bangaram (1), 84 mm. Minicoy (1) 89 mm.

D₁. VIII; D₂. I, 20; A. II, I, 16-17; P. ii, 18; V. I, 5. LI. 92. GR. 5+1+15.

Head 3 in standard length, 3.7 in total length. Depth of body 2.3 in standard length, 2.8 in total length. Eye 4.4 in head, 1.3 in snout and 1.2 in interorbital space. Maxillary reaching somewhat to below middle of eye. Teeth villiform in the upper jaw with the outer row enlarged anteriorly; a single row of teeth in lower jaw; villiform teeth present on vomer, palatines and tongue.

Breast naked ventrally with a median patch of minute scales before ventrals. Anterior part of lateral line arched, the arched portion shorter than the straight part with 30 scutes. Pectoral falcate, slightly shorter than head. Colour: Greenish grey above, silvery below. Juveniles with five broad cross bands on sides. Spinous dorsal greyish, other fins pale yellowish.

Local name: *Kuluvel* (Bangaram).

Distribution: Widely distributed in the tropical Indo-Pacific from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Samoan, Society, Marquesas and Hawaiian Islands and south to Australia.

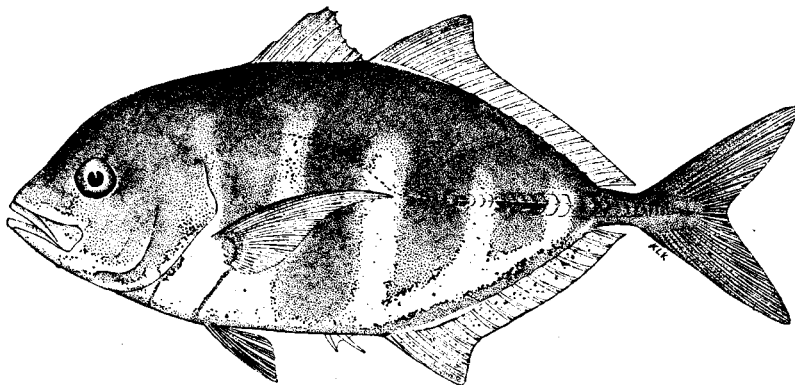


FIG. 236. *Caranx ignobilis* (Forskål), 84 mm.

237. *Caranx melampygus* Cuvier

Caranx melampygus Cuvier and Valenciennes, Hist. Nat. Poissons, 9, p. 116, 1833. Day Fishes of India, p. 214, pl. 50, fig. 3, 1878. Smith, Fishes of Southern Africa, p. 216, 1949. Munro, Fishes of Ceylon, p. 129, pl. 23, fig. 358, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Smith and Smith Fishes of Seychelles, p. 20, pl. 11, I, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/186).

Caranx (Caranx) melampygus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 248, 1931.

Specimens studied: Ameni (1), 110 mm. Kiltan (1), 80 mm. Minicoy (2), 330 and 445 mm.

D₁. VIII; D₂. I, 22-23; A. II, I, 18-19; P. ii, 19; V. I, 5. Ll. 92-97. GR. 7-8 + 1 + 17 + 19.

Head 3.1-3.4 in standard length, 3.7-4.2 in total length. Depth of body 2.9-3.1 in standard length, 3.5-3.8 in total length. Eye with a broad posterior adipose lid, 5.6-6.0 in head, 1.7-1.9 in snout and about 1.6 in highly convex interorbital space. Maxillary reaching about middle of eye. Teeth in a villiform band in upper jaw, the outer row enlarged; a single row of teeth in lower jaw; vomer, palatines and tongue with teeth. Anterior rays of soft dorsal and anal elongate, somewhat falcate. Pectoral falciform, much longer than length of head. Lateral line arched anteriorly, becoming straight below about 4th dorsal ray and the arched portion about $1/5$ shorter than the straight part with 36-38 scutes. Chest entirely scaled. Colour: Bluish green to brownish on back becoming silvery white on lower sides. Dorsal and anal fins pale, lobes dark. Pectoral yellowish.

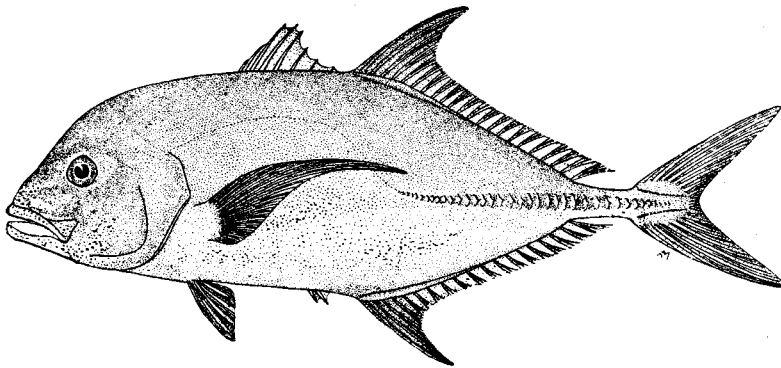


FIG. 237. *Caranx melampygus* Cuvier, 330 mm.

Local names: *Fanihandi* (Minicoy). *Kuluvel* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan and Hawaiian, Society and Marquesas Islands.

238. *Caranx stellatus* Eydoux and Souleyet

Caranx caeruleopinnatus Cuvier and Valenciennes, Hist. Nat. Poissons, 9, p. 119, 1833 (not of Ruppell).

Caranx stellatus Eydoux and Souleyet, Voy. Bonite, Zool., 1, p. 167, pl. 3, fig. 2, 1841. Smith, Fishes of Southern Africa, p. 216, pl. 25, fig. 512, 1949. Munro, Fishes of Ceylon, p. 129, pl. 23, fig. 359, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/187).

Caranx (*Caranx*) *stellatus* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 253, fig. 48, 1931.

Specimens studied: Bitra (1), 370 mm. Minicoy (4), 235 to 305 mm.

D₁. VIII; D₂. I, 23; A. II, I, 19; P. ii, 19; V. I, 5. Ll. 87. GR. 5+1+16-17.

Body strongly compressed, dorsal profile elevated. Head 3.3-3.5 in standard length, 4.2-4.4 in total length. Depth of body 2.8 in standard length, 3.5 in total length. Eye with posterior adipose lid; eye diameter 5.0-5.4 in head, 1.6-1.8 in snout and 1.4-1.6 in highly convex interorbital space. Maxillary reaching to below middle of eye. Teeth in upper jaw in a narrow band with the outer row enlarged; a single row of conical teeth in lower jaw; vomer, palatines and tongue toothed. Breast completely scaled. Anterior arched part of lateral line shorter than the straight part beginning below about 8th or 9th dorsal ray and having 32-35 scutes. Anterior lobe of soft dorsal about 1.5 in head, that of anal slightly shorter. Pectoral falcate, longer than head. Colour: Bluish with dusky tinge above, becoming silvery white below; small scattered blackish spots on sides of head and body. Spinous dorsal pale with dusky outer margin; anterior lobes of soft dorsal and anal and lobes of caudal dusky; pectoral and ventral pale with yellowish tinge.

Local names: *Mudahandi* (Minicoy). *Maduthala* (Bitra).

Distribution: Widespread from the east coast of Africa to the Laccadives, Ceylon, Andamans, Indonesia, Philippines, Australia and Marshall and Hawaiian Islands and eastwards to the coast of Mexico and Central America.

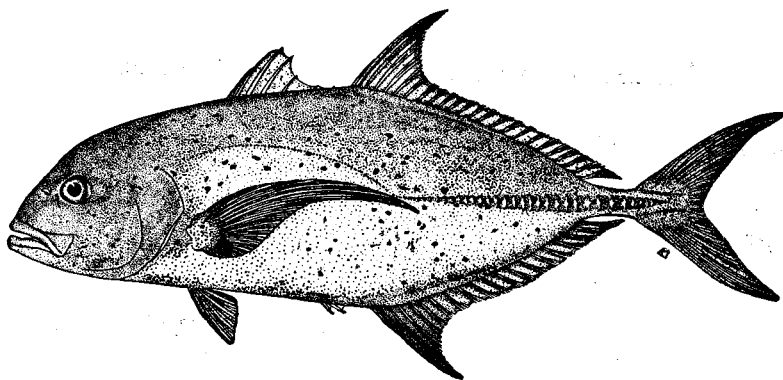


FIG. 238. *Caranx stellatus* Eydoux and Souleyet, 370 mm.

239. *Caranx lugubris* Poey

Caranx lugubris Poey, Mem. Hist. Nat. Cuba, 2, p. 222, 1861. Woods, Bull. U.S. Nat. Mus., 202, 1, p. 514, pl. 46, A, 1953. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 171, fig. 10, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/188).

Caranx ascensionis Cuvier and Valenciennes, Hist. Nat. Poissons, 9, p. 102, 1833 (not of Osbeck).

Specimens studied: Minicoy (2), 265 and 277 mm.

D₁. VIII; D₂. I, 22; A. II, I, 18; P. ii, 19; V. I, 5. Ll. 86. GR. 6+1+19.

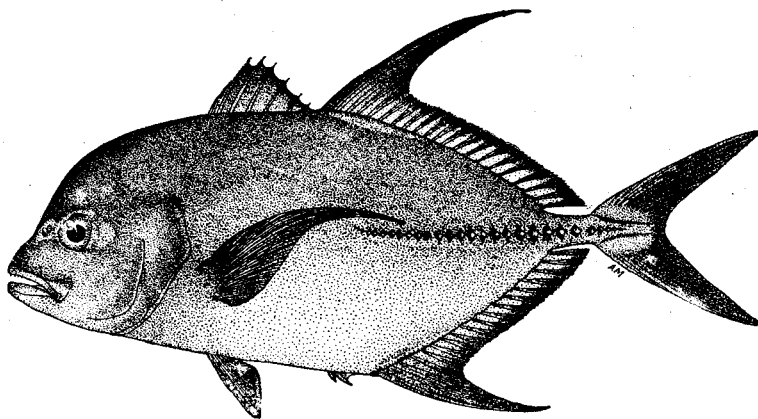


FIG. 239. *Caranx lugubris* Poey, 265 mm. (after Jones and Kumaran)

Head 3.2-3.3 in standard length, 4.2-4.3 in total length. Depth of body 2.3 in standard length, 2.8 in total length. Dorsal profile of head steeply descending to bluntly pointed snout with slight concavity before eyes. Eye with posterior adipose lid, eye diameter 4.5-4.6 in head, 1.5-1.6 in snout and 1.3 in inter-orbital space. Maxillary reaching below middle of eye. A narrow band of teeth anteriorly in upper jaw with the outer series enlarged, a single series of conical teeth in lower jaw; vomer, palatines and tongue toothed. Breast completely scaled. Lateral line arched, curved part about $1\frac{1}{2}$ in straight part beginning below about 5th dorsal ray, 31-32 scutes occupying the entire straight part of lateral line. Anterior rays of soft dorsal produced into a lobe, equal to or slightly longer than head; anterior lobe of anal shorter than that of dorsal. Pectoral longer than head. Colour: Dark brown on sides of head and back, becoming slightly lighter below. An indistinct dark spot at upper edge of gill opening; spinous dorsal blackish; base of soft dorsal and anal pale, lobes and distal margin blackish; pectoral greyish with dark base; ventral blackish especially towards extremity and caudal blackish.

Local name: *Kalufanihandi* (Minicoy).

Distribution: Widely distributed in the tropical Atlantic and has been recorded from Marshall, Tuamotu and Kingsmill Islands in the Pacific and Minicoy in the Laccadives.

240. *Caranx sexfasciatus* Quoy and Gaimard

Caranx sexfasciatus Quoy and Gaimard, Voy. *Uranie*, Zoology, p. 358, pl. 65, fig. 4, 1824. Smith, Fishes of Southern Africa, p. 216, pl. 25, fig. 511, 1949. Munro, Fishes of Ceylon, p. 128, pl. 23, fig. 357, 1955. Jones and Kumaran, Indian J. Fish., **6**, p. 46, 1959. Smith and Smith, Fishes of Seychelles, p. 20, pl. 11, K, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/189).

Caranx hippos Day, Fishes of India, p. 216, 1878 (not of Linnaeus).

Caranx (Caranx) sexfasciatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **6**, p. 243, 1931. Balan, J. Bombay nat. Hist. Soc., **55**, p. 300, 1958.

Specimens studied: Agathi (8), 57 to 182 mm. Ameni (3), 73 to 118 mm. Androth (15), 36 to 120 mm. Bitra (8), 58 to 150 mm. Kadamat (7), 124 to 155 mm. Kavarathi (12), 87 to 113 mm. Minicoy (16), 48 to 565 mm.

D₁. VII-VIII; D₂. I, 19-21; A. II, I, 15-17; P. ii, 18-19; V. I, 5. Ll. 90-95. GR. 6-7 +1+15-17.

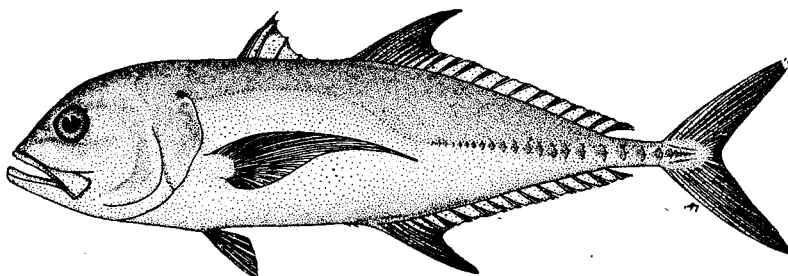


FIG. 240. *Caranx sexfasciatus* Quoy and Gaimard, 565 mm.

Head 3.1-3.4 in standard length, 4.0-4.3 in total length. Depth of body 2.6-3.6 in standard length, 3.3-4.5 in total length. Dorsal profile of head strongly arched. Eye with a posterior adipose lid, eye diameter 3.8-5.2 in head, equal to or slightly shorter than snout and about 1.1-1.3 in convex interorbital space. Maxillary reaching to below posterior third of eye in juveniles and to below hind border of eye in large adults. Teeth in upper jaw in a band with the outer row enlarged; single series of teeth in lower jaw; teeth present on vomer, palatines and tongue. Anterior part of lateral line arched, $\frac{1}{3}$ - $\frac{1}{4}$ shorter than straight part having 30-33 scutes and beginning below 5th to 8th dorsal ray. Breast completely scaly. Pectoral falcate, slightly longer than head. Anterior lobe of soft dorsal longer than half length of head; anterior lobe of anal slightly shorter. Colour: Light brownish above, lighter below with a small blackish spot at upper edge of gill opening. Spinous dorsal dusky distally; lobes of soft dorsal, anal and caudal blackish distally, rest of the fins slightly dusky; pectoral and ventral pale. Young specimens with 6 or 7 broad dark cross bands on sides of body, gradually disappearing with growth.

Local names: *Digufanihandi*, *Korakali* (Minicoy). *Kuluvel*, *Maduthala* (other islands).

Distribution: From the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, China, Japan, Australia and Marianas, Marshall, Gilbert, Sumoan and Hawaiian Islands.

241. *Elagatis bipinnulatus* (Quoy and Gaimard)

Seriola bipinnulata Quoy and Gaimard, Voy. *Uranie*, Zoology, **1**, p. 363, pl. 61, fig. 3, 1824. *Elagatis bipinnulatus* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **6**, p. 293, fig. 58, 1931. Smith, Fishes of Southern Africa, p. 223, fig. 543, 1949. Jones and Kumaran, Indian J. Fish., **6**, p. 46, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/190).

Seriolichthys bipinnulatus Day, Fishes of India, p. 228, pl. 51 A, fig. 1, 1878.

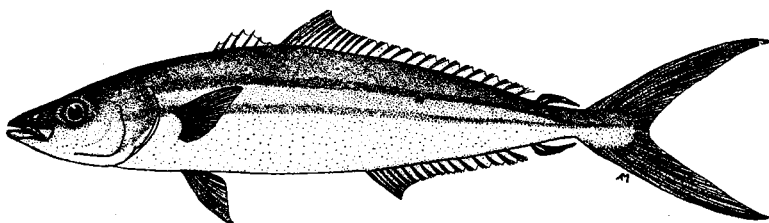


FIG. 241. *Elagatis bipinnulatus* (Quoy and Gaimard), 315 mm.

Specimens studied: Bitra (1), 315 mm. Chetlat (4), 49 to 57 mm. Kadamat (1), 480 mm. Minicoy (3), 440 to 520 mm.

D₁. VI; D₂. I, 24-26 + 2; A. II, I, 15-17 + 2; P. ii, 17-18; V. I, 5. GR. 10+1+23-27.

Head 3.6-4.0 in standard length, 4.8-5.2 in total length. Depth of body 4.5-5.1 in standard length, 6.0-6.7 in total length. Eye with very narrow adipose lid, its diameter 5.4-6.3 in head, 1.8-2.5 in snout and 1.8-2.3 in convex inter-orbital space. Maxillary reaching below midway to nostril and eye. Teeth in jaws villiform, in bands; present on vomer and palatines. Pectoral slightly longer than half length of head. Ventral equal to or slightly shorter than pectoral. Soft dorsal and anal slightly elevated anteriorly; both fins posteriorly with detached finlet of two rays. Two free anal spines covered by skin or sometimes absent. Lateral line slightly curved anteriorly, becoming straight above origin of anal fin. Colour: Dorsal side of head and back dark greyish to greenish grey becoming dirty yellowish with silvery tinge below, sides of head and body with two bluish bands upto base of caudal; these bands often obscure in large adults. Dorsal and anal yellowish grey; caudal slightly darker; pectoral pale yellowish to dusky; ventral pale, rays dusky distally.

Local name: *Maniya* (Minicoy). *Poomeen*, *Chameen* (other islands).

Distribution: Circumtropical.

242. *Naucrates ductor* (Linnaeus)

Gasterosteus ductor Linnaeus, Syst. Nat., ed. 10, p. 295, 1758.

Naucrates ductor Day, Fishes of India, p. 229, pl. 51 A, fig. 2, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 300, figs. 60-62, 1931. Smith, Fishes of Southern Africa, p. 221, pl. 24, fig. 535, 1949. Munro, Fishes of Ceylon, p. 131, pl. 24, fig. 371, 1955.

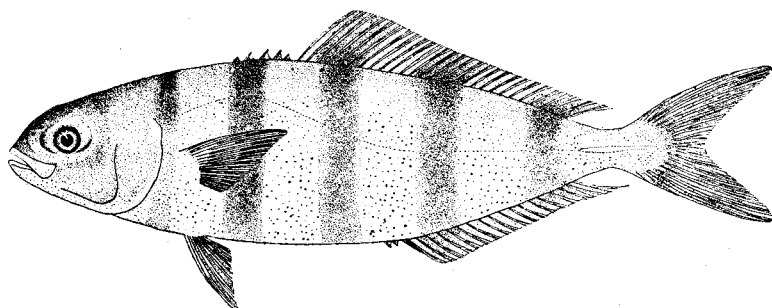


FIG. 242. *Naucrates ductor* (Linnaeus) (after Day).

Specimen studied: Kavarathi (1), 88 mm.

D. III-V, I, 26-28; A. II, I, 16-18; P. 21; V. I, 5.

Elongate, slightly compressed body. Upper profile of head convexly rounded. Head 3.6-4.0, depth of body 4.0-4.5, both in standard length. Eye 5-7 in head and more than 1.5 in snout. Maxillary nearly reaching front border of eye. Teeth small, in villiform bands in jaws. Dorsal spines short; anterior dorsal rays less than half length of head; front anal rays slightly shorter than those of dorsal. Caudal deeply forked. Scales small; no scutes on lateral line, caudal with a slight keel on each side. Colour: Bluish grey above, lighter below with six or seven broad dark cross bands on sides. Base of dorsal and anal dark grey; caudal blackish with white tips.

Distribution: All tropical and sub-tropical seas.

243. *Scomberoides sancti-petri* (Cuvier)

Chorinemus sancti petri Cuvier and Valenciennes, Hist. Nat. Poissons, 8, p. 379, pl. 236, 1831.

Chorinemus Sancti-Petri Day, Fishes of India, p. 230, 1878.

Chorinemus sanctipetri Smith, Fishes of Southern Africa, p. 224, 1949.

Chorinemus sancti-petri Munro, Fishes of Ceylon, p. 130, pl. 24, fig. 367, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959.

Chorinemus sancti petri Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 280, 1931.

Scomberoides sancti-petri Jones, Bull. cent. mar. Fish. Rés. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/191).

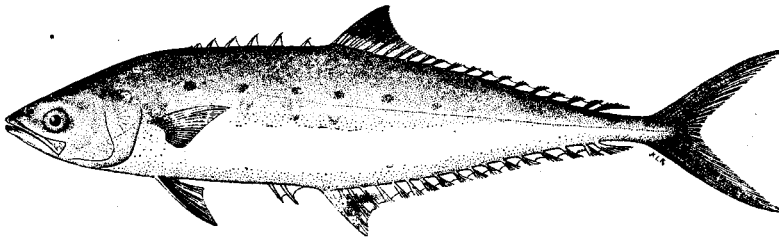


FIG. 243. *Scomberoides sancti-petri* (Cuvier), 405 mm.

Specimens studied: Kavarathi (1), 365 mm. Minicoy (4), 392 to 405 mm.

D₁. VII; D₂. I, 20-21; A. II, I, 18-19; P. ii, 14-15; V. I, 5. GR. 6-7+1+15-17.

Head 4.3-4.6 in standard length, 5.3-5.6 in total length. Depth of body 4.0-4.3 in standard length, 5.0-5.3 in total length. Eye 4.5-5.2 in head, 1.2-1.4 in pointed snout and 1.4-1.6 in interorbital space. Maxillary extending to or just beyond hind border of eye. A villiform band of teeth anteriorly in upper jaw, posteriorly in a single row; in two rows in lower jaw; villiform teeth on vomer, palatines, pterygoids and tongue. Dorsal spines flattened and not overlapping. Anterior rays of soft dorsal high, more than half length of head, anterior rays of anal slightly shorter. Pectoral almost equal to postorbital length of head with half diameter of eye together; ventral slightly shorter. Scales more or less lanceolate, pointed. Colour: Dark bluish above, silvery to yellowish below, tip of jaws slightly blackish, a dark blue oblique band from upper edge of gill opening to axil of pectoral, about 8 dark blotches on sides becoming smaller posteriorly above lateral line and 5-6 dark blotches just below lateral line. Anterior rays of dorsal with black blotch on distal 2/3rd, rest of the fin dusky; anal fin with black blotch between 2nd and 4th rays; caudal dusky; pectoral dusky with pale margin; ventral pale, first two rays often dusky.

Local names: *Karivali* (Minicoy). *Phunudi* (Kavarathi).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, North Australia and Marshall, Fiji, Samoan and Hawaiian Islands.

244. *Scomberoides tol* (Cuvier)

Chorinemus tol Cuvier and Valenciennes, Hist. Nat. Poissons, 8, p. 385, 1831. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 283, 1931. Smith, Fishes of Southern Africa, p. 224, fig. 544, 1949. Munro, Fishes of Ceylon, p. 130, pl. 24, fig. 364, 1955.

Chorinemus moadetta Day, Fishes of India, p. 230, pl. 51 B, fig. 1, 1878.

Scomberoides tol Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/192).

Specimens studied: Agathi (1), 293 mm. Ameni (1), 310 mm. Bitra (1), 280 mm. Minicoy (3), 280 to 320 mm.

D₁: VII; D₂: I, 20-21; A: II, I, 18-19; P: ii, 14-15; V: I, 5. GR. 7+1+16-17.

Head 4.5-4.7 in standard length, 5.5-5.7 in total length. Depth of body 4.3-4.5 in standard length, 5.2-5.4 in total length. Dorsal profile slightly concave above the eyes. Eye 4.7-5.2 in head, 1.3-1.4 in snout and 1.5-1.6 in interorbital space. Maxillary reaching below hind border of pupil. In upper jaw a villiform band of teeth anteriorly, posteriorly in a single series; in two rows in lower jaw; villiform teeth present on vomer, palatines, pterygoides and tongue. Dorsal spines overlapping and not flattened; anterior rays of soft dorsal about twice in head; anterior rays of anal shorter. Pectoral longer than half length of head, ventral slightly shorter. Scales needle shaped and interdigitating. Colour: Bluish above, silvery below; 7 or 8 vertically oblong blackish blotches on sides, the anterior 3 or 4 on the lateral line and the posterior ones above the lateral line being smaller and sometimes indistinct. Distal part of anterior rays of dorsal blackish, rest of the fin slightly dusky. Anal, pectoral and ventral pale yellowish. Caudal dusky.

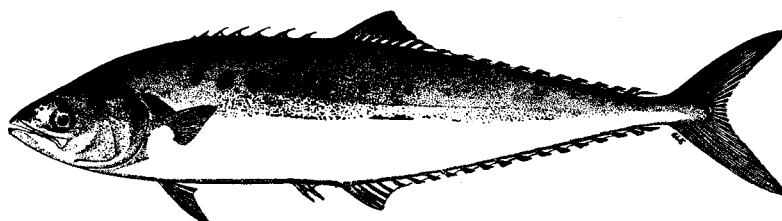


FIG. 244. *Scomberoides tol* (Cuvier), 293 mm.

Local names: *Karivali* (Minicoy). *Phunudi* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Taiwan and Japan.

245. *Trachinotus blochi* (Lacépède)

Caesiomorus blochii Lacépède, Hist. Nat. Poissons, 3, p. 95, pl. 3, fig. 2, 1802.

Trachinotus blochi Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 286, 1931. Munro, Fishes of Ceylon, p. 130, pl. 22, fig. 368, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/193).

Trachinotus blochii Smith, Fishes of Southern Africa, p. 223, pl. 25, fig. 542, 1949.

Trachynotus ovatus Day, Fishes of India, p. 234, pl. 51 B, fig. 2, 1878.

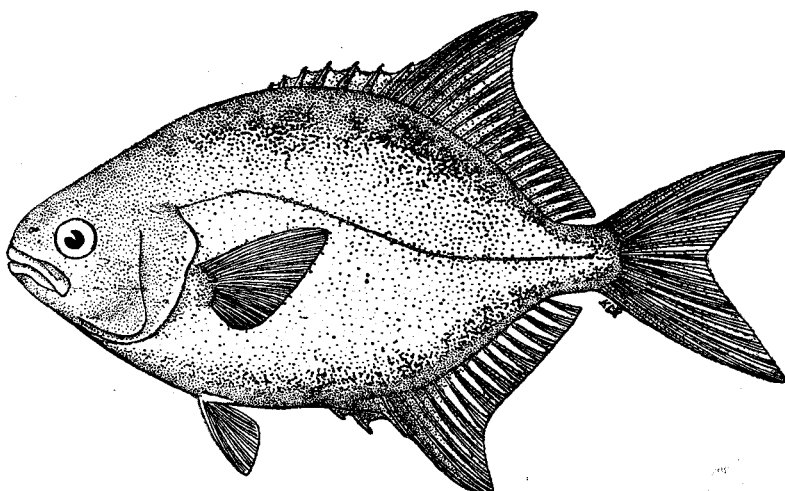


FIG. 245. *Trachinotus blochi* (Lacépède), 68 mm.

Specimens studied: Bitra (4), 49 to 73 mm. Kalpeni (15), 46 to 54 mm. Kavarathi (1), 52 mm. Minicoy (19), 41 to 94 mm.

D₁. VI; D₂. I, 18-20; A. II, I, 16-18; P. ii, 16; V. I, 5. GR. 5+1+10-11.

Head 3.1-3.4 in standard length, 4.2-4.5 in total length. Depth of body 1.7-1.9 in standard length, 2.3-2.4 in total length. Eye 3.7-4.3 in head, 1.0-1.2 in snout and 1.3-1.4 in highly convex interorbital space. Maxillary nearly reaching below middle of eye. Villiform teeth in jaws, disappearing in adult. Scales small, lateral line slightly curved anteriorly. Dorsal spines connected by membrane in small specimens. Anterior rays of dorsal and anal produced, much more than length of head in large specimens. Pectoral as long as head without snout. Caudal deeply forked. Colour: Greyish above becoming silvery white with yellowish tinge below. Fins yellowish hyaline, lobes of dorsal and anal and outer rays of caudal dark.

Local names: *Fathivali* (Minicoy). *Peeyada* (other islands).

Distribution: Tropical Indo-Pacific from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, China, Japan, Australia and Samoan, New Hebrides and Tonga Islands.

246. *Trachinotus bailloni* (Lacépède)

Caesiomorus bailloni Lacépède, Hist. Nat. Poissons, 3, p. 93, pl. 3, fig. 1, 1802.

Trachinotus bailloni Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 288, fig. 57, 1931. Smith, Fishes of Southern Africa, p. 223, fig. 541, 1949. Munro, Fishes of Ceylon, p. 131, pl. 22, fig. 369, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 82/194).

Trachynotus baillonii Day, Fishes of India, p. 233, pl. 51 A, fig. 4, 1878.

Specimens studied: Agathi (3), 108 to 195 mm. Bitra (8), 66 to 94 mm. Chetlat (9), 74 to 106 mm. Kalpeni (11), 49 to 138 mm. Kavarathi (6), 73 to 116 mm. Minicoy (23), 61 to 150 mm.

D₁-VI; D₂. I, 22-24; A. II, I, 22-24; P. ii, 15-16; V. I, 5. GR. 8+1+14-16.

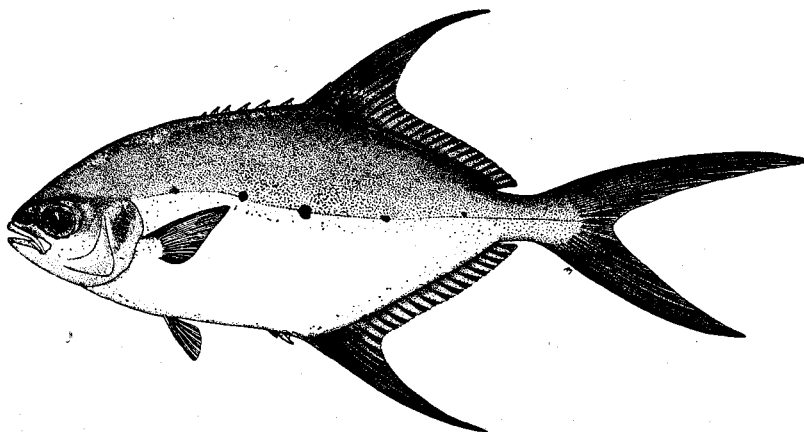


FIG. 246. *Trachinotus bailloni* (Lacépède), 195 mm.

Head 3.6-3.8 in standard length, 5.1-5.5 in total length. Depth of body 2.1-2.4 in standard length, 3.1-3.3 in total length. Eye 3.8-4.2 in head, 1.0-1.1 in bluntly rounded snout and 1.3 in convex interorbital space. Maxillary reaching to below anterior border of iris. Teeth villiform in jaws, vomer and palatines. Scales small, lateral line only slightly curved anteriorly. Anterior rays of soft dorsal and anal produced, extending nearly to end of the fins in adults. Pectoral slightly shorter than head without snout. Ventral $1\frac{1}{2}$ length of snout. Caudal with produced lobes, the upper slightly the longer. Colour: Upper parts of head and back greyish with bluish tinge, becoming lighter on sides and silvery white below. 3-5 round black spots along sides on lateral line. Fins pale yellowish, elongate lobes of dorsal, anal and caudal blackish.

Local names: *Vali* (Minicoy). *Anjupulli* (other islands).

Distribution: Widely distributed in the tropical Indo-Pacific from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, Ryukyu Islands, Japan and Ellice, Samoan, Society, Marquesas and Hawaiian Islands.

Family CORYPHAENIDAE

Body elongate, compressed, forehead prominent, body tapering to caudal peduncle. Mouth wide, oblique. Bands of teeth on jaws, vomer and palatines and two patches of minute teeth on tongue. Operculum entire. A single long dorsal fin with several rays, its origin on nape. Anal long beginning below middle of body. Scales small, cycloid. Lateral line complete, bent above pectoral but running straight behind pectoral.

247. *Coryphaena hippurus* Linnaeus

Coryphaena hippurus Linnaeus, Syst. Nat., ed. 10, p. 261, 1758. Day, Fishes of India, p. 248, pl. 53, fig. 6, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 185, figs. 37-39, 1931. Smith, Fishes of Southern Africa, p. 314, pl. 63, fig. 872, 1949. Munro, Fishes of Ceylon, p. 132, pl. 24, fig. 375, 1955. Jones and Kumaran, Indian J. Fish., 6 p. 46, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 13, 1969 (Cat. No. CMFRI-LA-F. 81/195).

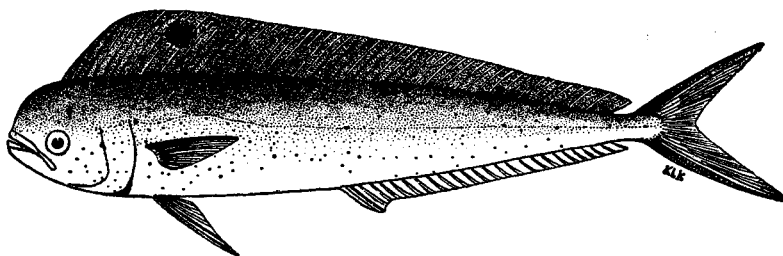


FIG. 247. *Coryphaena hippurus* Linnaeus, 550 mm.

Specimens studied: Ameni (3), 110 to 270 mm. Androth (1), 550 mm. Minicoy (4), 420 to 570 mm.

D. 50-59; A. 25-28; P. ii, 16; V. I, 5.

Head 4.2-4.7 in standard length, 5.3-5.9 in total length. Depth of body 4.0-4.5 in standard length, 5.2-5.7 in total length. Profile of head steeply descending. Eye 4.3-5.0 in head, 1.0-1.5 in snout and 1.3-1.6 in highly convex interorbital space. Mouth wide; maxillary reaching nearly to below middle of eye, 2.2-2.5 in head. Dorsal fin originating above a level of middle of eye. Jaws with small conical teeth in a broad patch anteriorly becoming narrower

behind. Vomer, palatines and tongue with a patch of very small teeth. Pectoral falcate, equal to postorbital length of head and $\frac{1}{2}$ eye diameter together. Ventral half length of snout shorter than head. Shape of the body changes very much with growth. Colour: Greenish blue on back, becoming yellowish golden below with several small irregular blackish spots on sides of body.

Local names: *Fiyala* (Minicoy). *Affunose* (other islands).

Distribution: Tropical and subtropical Atlantic, Pacific and Indian Oceans.

Family EMMELICHTHYIDAE

Elongate, scarcely compressed. Mouth oblique, protrusible, maxillary dilated posteriorly. Teeth minute, variably present or absent on jaws and vomer. Preoperculum entire or crenulate. Operculum with one or two flat spines. Eye with or without an adipose eye lid. A single dorsal fin, sometimes the last four or five spines isolated. Anal fin similar to soft part of dorsal and with three spines. Six or seven branchiostegals. Pseudobranchiae present. Scales small or moderate, weakly ctenoid; lateral line convexly curved.

248. *Dipterygonotus leucogrammicus* Bleeker

Dipterygonotus leucogrammicus Bleeker, Jour. Indian Archipelago, 3, p. 71, 1849. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 180, fig. 35, 1931. Munro, Fishes of Ceylon, p. 133, 1955. Jones, Proc. Symposium on Scombroid Fishes, p. 660, fig. 24, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 96/196).

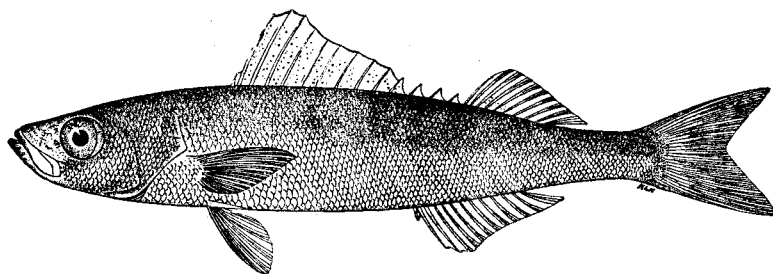


FIG. 248. *Dipterygonotus leucogrammicus* Bleeker, 73 mm.

Specimens studied: Minicoy (340), 35 to 75 mm.

D. XIV, I, 9-10; A. III, 9-10; P. 16-17; V. I, 5. Ll. 80-85; Ltr. 9-10 + 1+16-17.

Head 3.7-4.0 in standard length, 4.6-4.8 in total length. Depth of body 4.7-5.2 in standard length, 5.7-6.3 in total length. Eye 3.2-3.7 in head, 0.8-1.0 in snout and about 0.8 in interorbital space. Intermaxillary protractile. Mandible

elevated posteriorly. Maxillary reaching to below front border of eye. Rounded angle of preoperculum finely denticulate. A flat spine on operculum. Second or third dorsal spine longest, equal to or slightly longer than snout and eye together. Spines decreasing in length to the last, membranes between last four or five spines triangular. Third anal spine slightly longer than second spine and more than diameter of eye. Pectoral equal to postorbital length of head with $2/3$ eye diameter. Ventral shorter than pectoral. Colour: Brownish grey above, becoming silvery white below with whitish longitudinal band on sides. Fins hyaline.

Local name: *Kura* (Minicoy).

Distribution: Aldabra, Laccadives, Ceylon, Indonesia to the Philippines and Indo-China.

Note: This is an important tuna live bait generally during January to April.

Family LUTIANIDAE

Body oblong to elongate, moderately compressed. Mouth terminal, fairly large. Several rows of minute or conical teeth in jaws, outer row sometimes enlarged and caninoid. Teeth present or wanting on vomer and palatines. Preoperculum often entire. Gill membranes free from isthmus. Scales moderate or small, often extending to vertical fins.

1. Dorsal and anal fins at least partly scaly. Preoperculum with a notch 2
Dorsal and anal fins not scaly. Preoperculum denticulate or smooth 9
2. About 70 long gill rakers on lower part of first gill arch. 11 anal rays. Pectorals longer than head. Dorsal profile of head strongly convex
..... *Macolor niger*
Not more than 20 slender gill rakers on lower part of first gill arch. 8-9
anal rays. Pectorals shorter than head 3
3. Scale rows above lateral line parallel with its course in anterior part only,
slightly ascending to dorsal profile below hind part of spinous dorsal.
Scales on head beginning behind eye. Eight transverse whitish bands on
body; dorsal dark brown distally, anterior part of anal and ventral dark
..... *Lutianus argentimaculatus*
Scale rows above lateral line ascending to dorsal profile, sometimes parallel
with its course only in front of and below first few spines of dorsal ... 4
4. Scales on head beginning somewhat above middle of eye. Supratemporal band
of scales meeting on dorsal surface of head. A large dark blotch on lateral
line below beginning of soft dorsal. Bluish longitudinal bands bordered
with brown on head and body *Lutianus kasmira*
Scales on head beginning behind a vertical through hind border of eye ... 5
5. Scale rows below lateral line ascending to lengthwise axis of body. Preoper-
cular notch very deep. Caudal dark purple. Caudal peduncle and caudal
dark brown in juveniles *Lutianus gibbus*

- Scale rows below lateral line parallel with lengthwise axis of body 6
6. A black blotch on lateral line below anterior rays of dorsal. A triangular patch of vomerine teeth with a posterior prolongation. Not more than nine well developed gill rakers on lower half of first gill arch 7
- No black blotch on lateral line below anterior rays of dorsal. A triangular patch of vomerine teeth without a posterior prolongation. More than 9 gill rakers on lower half of first gill arch 8
7. Most of the blotch below lateral line. D. X, 13-14 *Lutianus fulviflamma*
Most of the blotch above lateral line. D. X, 14-15 *Lutianus russelli*
8. 15-16 gill rakers on lower part of first gill arch. Preopercle with a shallow notch. Reddish brown above, pinkish below. Juveniles with two white blotches on sides *Lutianus bohar*
- Usually 10 gill rakers on lower part of first gill arch. Preopercle with a well developed notch. Brownish grey on back, whitish below; 7-8 yellow longitudinal bands on sides *Lutianus vaigiensis*
9. Teeth on vomer and palatines. Llat. about 50 *Aprion virescens*
Palate edentulous. Llat. about 70. 16 or 17 gill rakers on lower half of first gill arch *Aphareus furcatus*

249. *Macolor niger* (Forskål)

Sciaena niger Forskål, Descript. Animal., p. 47, 1775.

Lutianus niger Day, Fishes of India, Suppl., p. 783, 1888.

Lutjanus niger Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 289, 1936.

Macolor niger Smith and Smith, Fishes of Seychelles, p. 27, pl. 24, G, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 95/197).

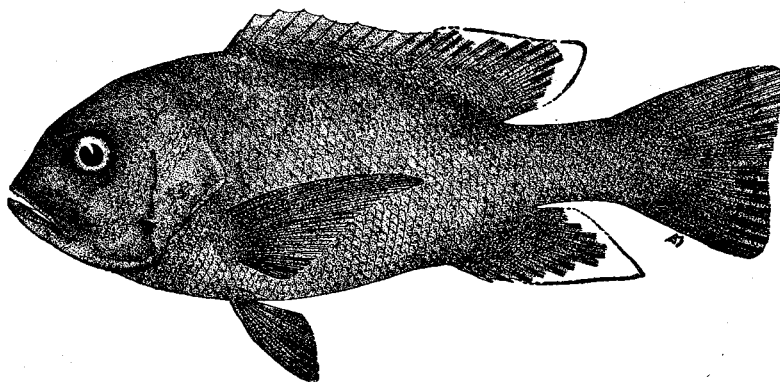


FIG. 249. *Macolor niger* (Forskål), 435 mm.

Specimen studied: Kavarathi (1), 435 mm.

D. X, 14; A. III, 11; P. ii, 15; V. I, 5. Ll. 52; Ltr. 9+1+22. GR. 34+1+69.

Head 2.9 in standard length, 3.5 in total length. Depth of body 2.6 in standard length, 3.1 in total length. Body compressed, back elevated. Eye 4.4 in head, 1.3 in snout and 1.6 in somewhat keeled interorbital space. Maxillary reaching to below front third of eye. Teeth in narrow bands in jaws, outer series enlarged, those in front of upper jaw larger than others. A small patch of teeth on vomer and in narrow bands on palatines. Scales beginning behind hind border of eye. Supratemporal band of scales present. Preoperculum with seven rows of scales. Preoperculum with a deep notch, interopercular knob conical and directed forwards. Scale rows above lateral line oblique, those below lateral line horizontal. Longest dorsal spine as long as snout. Third anal spine slightly shorter than snout. Soft dorsal and anal well pointed behind. Pectoral slightly longer than head. Ventral longer than half length of head. Colour: Head and body dark brown, slightly lighter on chest and belly. Fins dark brown, distal part of soft dorsal and anal lighter.

Distribution: Red Sea and east coast of Africa to the Laccadives, Maldives, India, Indonesia, Philippines and Palau and Solomon Islands.

250. *Lutianus argentimaculatus* (Forskål)

Sciaena argentimaculata Forskål, Descript. Animal., p. 47, 1775.

Lutianus argentimaculatus Day, Fishes of India, p. 37, pl. 11, fig. 5, 1878. Smith, Fishes of Southern Africa, p. 255, pl. 37, fig. 664, 1949. Munro, Fishes of Ceylon, p. 135, pl. 25, fig. 381, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 95/198).

Lutianus roseus Day, Fishes of India, p. 38, pl. 11, fig. 6, 1878.

Lutianus argentimaculatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 246, 1936.

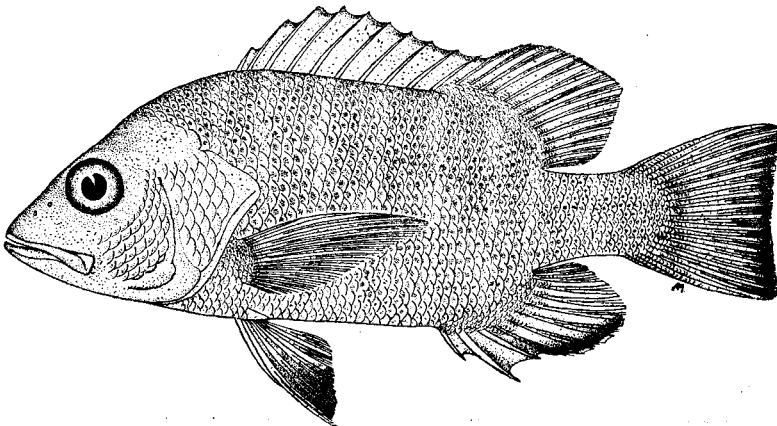


FIG. 250. *Lutianus argentimaculatus* (Forskål), 76 mm.

Specimen studied: Minicoy (1), 76 mm.

D. X, 14; A. III, 8; P. ii. 14; V. I, 5. Ll. 48; Ltr. 7+1+17. GR. 5+1+7.

Head equal to depth of body, 2.5 in standard length, 3.2 in total length. Eye 4.2 in head, 1.3 in snout and about 0.9 in interorbital space. Maxillary reaching somewhat below middle of eye. Outer row of teeth in jaws enlarged, especially those on side of mandible, those in front of upper jaw canines. A triangular patch of teeth on vomer and in an elongate patch on palatines. Preoperculum denticulate with a shallow emargination above its angle. Scales on head beginning behind eye. Temporal band of scales present. 7 rows of scales on preoperculum, hind and inferior limb naked. Scales above lateral line in longitudinal rows in front and in slightly oblique rows below soft dorsal; scale rows below lateral line horizontal. Third dorsal spine longest, shorter than postorbital length of head and shorter than longest dorsal ray. Second anal spine longer than the third, as long as longest dorsal spine and much shorter than longest anal rays. Pectoral slightly longer than head without snout. Ventral about 2/3 length of eye shorter than pectoral. Colour: Greyish brown, lighter below. Scales on sides with a dark centre. Eight transverse whitish bands on body. Dorsal dark brown distally. Anterior rays of anal dark brown, hind rays greyish. Ventral greyish, anterior rays dark especially towards tip. Caudal pale brownish, darker distally.

Local name: *Banda* (Minicoy).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India and Ceylon, Indonesia, Philippines, Ryukyus, Taiwan, south to Australia and east to New Britain, Kingsmill and Tuamotu Islands.

251. *Lutianus kasmira* (Forskål)

Sciaena kasmira Forskål, Descript. Animal., p. 46, 1775.

Lutianus bengalensis Day, Fishes of India, p. 33, pl. 10, fig. 4, 1878.

Lutianus kasmira Smith, Fishes of Southern Africa, p. 254, pl. 39, fig. 657, 1949. Munro, Fishes of Ceylon, p. 137, pl. 25, fig. 390, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 301, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 659, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F, 95/199).

Lutianus quinquelinearis Day, Fishes of India, p. 46, pl. 14, fig. 1, 1878.

Lutjanus kasmira Day, Fishes of India, Suppl., p. 783, 1888. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 256, 1936.

Specimens studied: Agathi (3), 83 to 128 mm. Ameni (2), 96 and 144 mm. Chetlat (5), 35 to 100 mm. Kavarathi (2), 129 and 144 mm. Kiltan (6), 30 to 148 mm. Minicoy (15), 45 to 252 mm.

D. X-XI, 14-15; A. III, 8; P. ii. 13-14; V. I, 5. Ll. 54-67; Ltr. 8-9 + 1 + 19-21. GR. 6-7+1+13-14.

Head 2.5-2.7 in standard length, 3.2-3.4 in total length. Depth of body 2.6-2.9 in standard length, 3.3-3.7 in total length. Eye 3.8-4.2 in head, 1.3-1.4 in snout and 0.8-0.9 in interorbital space. Maxillary reaching to below or slightly posterior to a level from the anterior border of pupil. Teeth in narrow bands in jaws, outer row often caninoid. Teeth on vomer and palatines. Preoperculum with deep notch, its hind border and lower border strongly denticulated. Interopercular knob well developed. Scales on head beginning above middle of orbit, supratemporal band of scales meeting on dorsal surface of head. Dorsal spines increasing in length to the fourth, it being longest, equal to or a little more than length of snout and following spines gradually decreasing in length. Second anal spine stronger and longer than the third, nearly equal to longest dorsal spine. Pectoral one eye diameter shorter than head, ventral as long as postorbital length of head with $\frac{1}{2}$ eye diameter. Colour: Yellowish, slightly darker above. Head and body with fine bluish longitudinal bands bordered with brown. A large black blotch on lateral line below beginning of soft dorsal. Fins light yellowish. Margin of dorsal fin dusky.

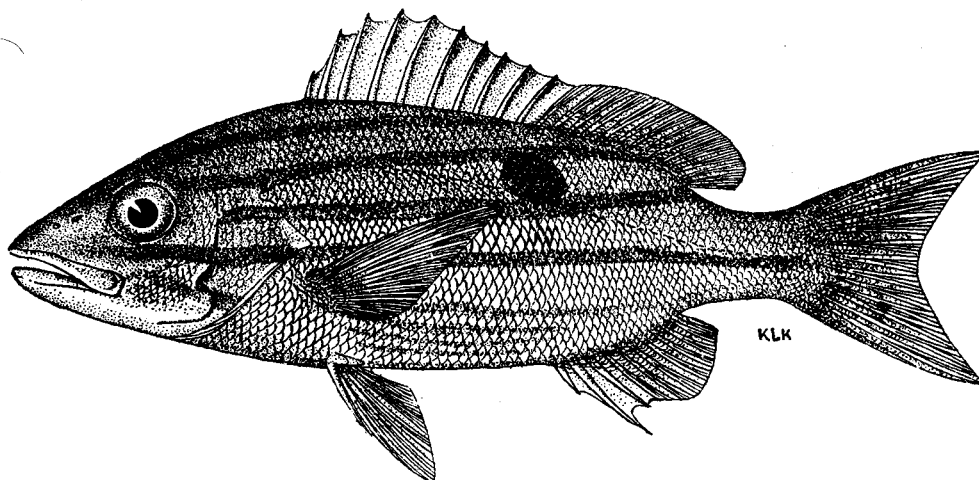


FIG. 251. *Lutianus kasmira* (Forskål), 110 mm.

Local names: *Reendumas* (Minicoy). *Manhan* (other islands).

Distribution: Widely distributed from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Malaysia, Philippines, China, Japan, Australia and to the Marquesas Islands.

Note: In an exceptional case only IX dorsal spines present

252. *Lutianus gibbus* (Forskål)

Sciaena gibba Forskål, Descript. Animal., p. 46, 1775.

Lutianus gibbus Day, Fishes of India, p. 43, pl. 13, figs. 2 and 3, 1878. Smith, Fishes of Southern Africa, p. 254, pl. 37, fig. 662, 1949. Munro, Fishes of Ceylon, p. 138, pl. 26, fig. 396, 1955. Balan, J. Bombay nat. Hist. Soc., **55**, p. 301, 1958. Jones and Kumaran, Indian J. Fish., **6** p. 46, 1959. Jones Bull. cent. mar. Fish. Res. Inst., **8**, p. 14, 1969 (Cat. No. CMFRI-LA-F. 95/200).

Lutjanus gibbus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **7**, p. 263, 1936.

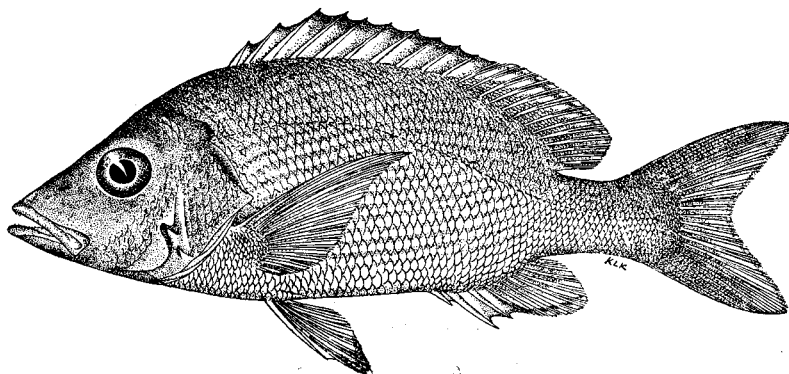


FIG. 252. *Lutianus gibbus* (Forskål), 170 mm.

Specimens studied: Agathi (12), 49 to 178 mm. Ameni (13), 29 to 184 mm. Androth (1), 92 mm. Bitra (9), 57 to 108 mm. Chetlat (1), 127 mm. Kadamat (4), 38 to 86 mm. Kalpeni (2), 47 and 68 mm. Kavarathi (6), 63 to 232 mm. Minicoy (13), 45 to 205 mm.

D. X, 14-15; A. III, 8-9; P. ii, 15; V. I, 5. Ll. 52-58; Ltr. 8-9 + 1 + 19-21. GR. 9-10 + 1 + 18-20.

Head 2.4-2.7 in standard length, 3.2-3.5 in total length. Depth of body 2.5-2.7 in standard length, 3.3-3.5 in total length. Eye 3.8-4.3 in head, 1.3-1.5 in snout and 0.8-1.0 in interorbital space. Maxillary reaching to below front border of eye. Teeth in narrow bands in jaws, outer series canine like, especially those anteriorly. Teeth on vomer and palatines. Preoperculum denticulated, with a deep notch. Interopercular knob well developed. Scales beginning behind a vertical through hind border of eye. 5-6 rows of scales on cheeks. Scale rows above lateral line and those below it obliquely ascending to dorsal profile. Third or fourth dorsal spine longest, about 1.4 eye diameter, posterior spines gradually becoming shorter. Second anal spine stronger and slightly longer than 3rd anal spine, the former slightly longer than diameter of eye. Pectoral about half length of snout shorter than head, ventral nearly equal to snout and eye together. Colour: Yellowish brown above, lighter below. Dorsal and anal dusky at base, with

dark submarginal band and whitish border. Axil of pectoral dark, fin yellowish. Ventral yellowish, slightly dark distally. Caudal dark purple. Caudal peduncle and caudal fin dark brown in juveniles.

Local names: *Ginimas* (Minicoy). *Chemmal* (other islands).

Distribution: From the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Australia and eastwards to Caroline and Tuamotu Islands.

253. *Lutianus fulviflamma* (Forskål)

Sciaena fulviflamma Forskål, Descript. Animal., p. 45, 1775.

Lutianus fulviflamma Day, Fishes of India, p. 41, pl. 12, fig. 6, 1878. (in part). Smith, Fishes of Southern Africa, p. 254, pl. 38, fig. 659, 1949. Munro, Fishes of Ceylon, p. 136, pl. 25, fig. 386, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 95/201).

Lutjanus fulviflamma Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 270, 1936.

Specimens studied: Agathi (1), 99 mm. Minicoy (6), 27 to 64 mm.

D. X, 13-14; A. III, 8; P. ii, 14; V. I, 5. Ll. 49; Ltr. 7+1+ 16. GR. 6+1+8.

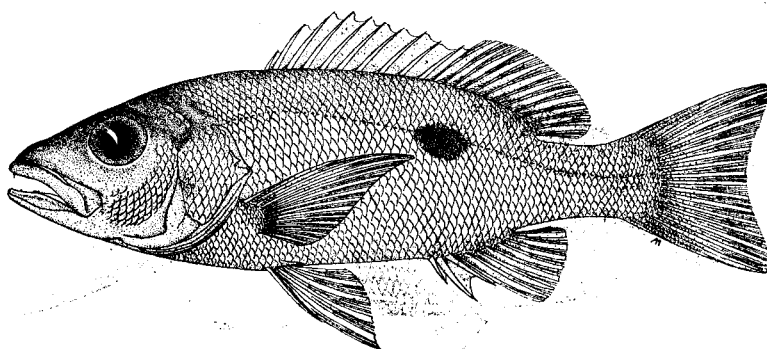


FIG. 253. *Lutianus fulviflamma* (Forskål), 99 mm.

Head 2.5-2.6 in standard length, 3.2-3.3 in total length. Depth of body 2.7-2.9 in standard length, 3.4-3.6 in total length. Eye 3.8-4.2 in head, 1.2-1.3 in snout and 0.8 in nearly flat interorbital space. Maxillary reaching to below first 2/5 of eye. Small teeth in bands in jaws, outer series especially those anteriorly in upper jaw and sides of mandible canines. Teeth in a triangular patch on vomer and in an oval patch on palatines. Preopercle with very shallow emargination and serrations. Scales on occiput beginning behind hind border of eye.

Scales in oblique rows above lateral line and in horizontal rows below it. Fourth dorsal spine longest, equal to 1.4 eye diameter. Third anal spine slightly longer than 2nd, little more than eye diameter. Pectoral longer than head without snout. Ventral equal to snout and eye together. Colour: Light reddish brown above, silvery below with a large blackish blotch below commencement of lateral line, most of it below the lateral line. Fins pale yellowish. Axil of pectoral slightly dark. Small specimens with 3 or 4 dusky longitudinal bands on sides, the upper one from snout through eye to caudal peduncle being more prominent.

Local names: *Luggambanda* (Minicoy). *Chutton*, *Chuttommetti* (Agathi).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Australia and eastwards to Fiji and Tahiti Islands.

254. *Lutianus russelli* (Bleeker)

Mesoprion russelli Bleeker, Verh. Bat. Gen., 22, Percoiden, p. 41, 1849.

Lutianus fulviflamma Day, Fishes of India, p. 41, pl. 12, fig. 5, 1878 (in part).

Lutianus russelli Smith, Fishes of Southern Africa, p. 254, pl. 39, fig. 660, 1949. Munro, Fishes of Ceylon, p. 136, pl. 25, fig. 387, 1955. Jones Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 95/202).

Lutianus russelli Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 272, 1936.

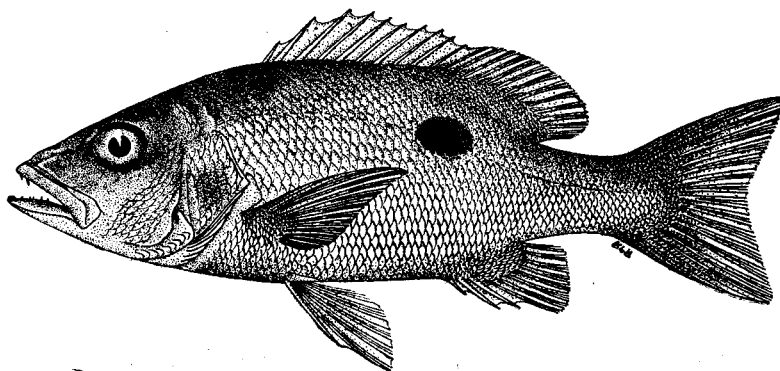


FIG. 254. *Lutianus russelli* (Bleeker), 148 mm.

Specimens studied: Ameni (11), 82 to 130 mm. Bangaram (10), 38 to 136 mm. Kadamat (1), 110 mm. Kavarathi (8), 103 to 148 mm. Kiltan (14), 31 to 86 mm. Minicoy (20), 81 to 128 mm.

D. X, 14-15; A. III, 8; P. ii, 13-14; V. I, 5. Ll. 49-52; Ltr. 7+1+16-17. GR. 5-6+1+8-9.

Head 2.3-2.6 in standard length, 3.1-3.4 in total length. Depth of body 2.6-2.8 in standard length, 3.4-3.6 in total length. Eye 4.0-4.3 in head, 1.3-1.5 in snout and 0.8-0.9 in somewhat flat interorbital space. Maxillary reaching to below front border of pupil. Small teeth in narrow bands in jaws, outer series canine like, especially those anteriorly. Teeth on vomer and palatines. Preoperculum with a shallow notch, its posterior and inferior border denticulate. Scales on occiput beginning above hind border of eye. Scales in oblique rows above lateral line and in horizontal rows below it. Third, fourth and fifth dorsal spines subequal, 1.3 eye diameter, posterior spines gradually decreasing in length to the last, it being shorter than eye diameter. Second and third anal spines subequal, a little longer than diameter of eye. Pectoral about an eye diameter shorter than head. Ventral a little longer than snout and eye together. Colour: Brownish above, silvery below with an oblong blackish blotch below anterior rays of soft dorsal, most of it above the lateral line. Fins yellowish, dorsal slightly dusky distally.

Local names: *Luggambanda* (Minicoy). *Chutton*, *Chuttommetti* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan, Australia and Solomon and New Caledonia Islands.

255. *Lutianus bohar* (Forskål)

Sciaena bohar Forskal, Descript. Animal., p. 46, 1775.

Lutianus bohar Day, Fishes of India, p. 44, pl. 13, fig. 4, 1878. Smith, Fishes of Southern Africa, p. 255, fig. 667, 1949. Munro, Fishes of Ceylon, p. 136, pl. 25, fig. 384, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 95/203).

Lutjanus bohar Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 276, 1936.

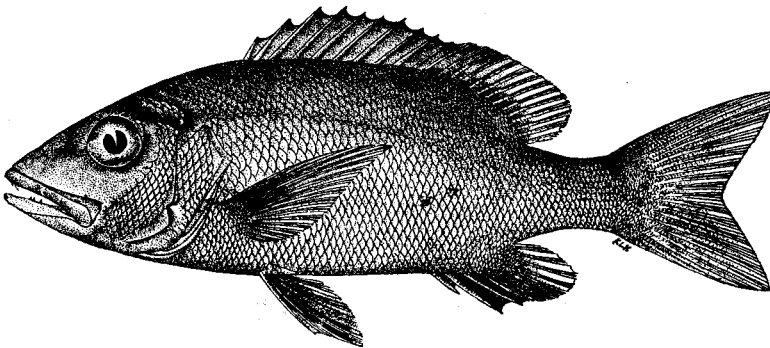


FIG. 255. *Lutianus bohar* (Forskål), 195 mm.

Specimens studied: Agathi (2), 161 and 350 mm. Bangaram (1), 135 mm. Kavarathi (1), 326 mm. Minicoy (8) 180 to 575 mm.

D. X, 14; A. III, 8; P. ii, 14-15; V. I, 5. Ll. 51-56; Ltr. 8-9+1+19-20. GR. 7-8+1+15-16.

Head 2.5-2.6 in standard length, 3.2-3.3 in total length. Depth of body 2.6-2.9 in standard length, 3.4-3.7 in total length. Eye 4.0-4.8 in head, 1.4-1.8 in snout and 1.0-1.3 in almost flat interorbital space. Maxillary reaching to below anterior third of eye. Teeth in bands in jaws, outer row enlarged, canine like, 2 teeth anteriorly in upper jaw fang like. Teeth present on vomer and platines. Hind border of preopercle serrated and with a shallow notch, interopercle with a small knob. Pectoral about half length of snout shorter than head. Ventral shorter than pectoral by one eye diameter. Scales above lateral line in oblique rows, those below lateral line parallel to axis of body. Scales not extending to interorbital space, temporal region naked. 3rd or 4th dorsal spine longest, 1.3-1.7 of eye diameter and longer than 3rd anal spine. Colour: Reddish brown above, becoming pinkish below, cheeks and throat yellow; scales of body with whitish spots. Spots and blotches obscure in preserved specimens. Spinous dorsal and anterior part of soft dorsal dark scarlet to blackish terminally; anterior part of anal dark brown, lighter posteriorly. Pectoral yellowish with upper rays brownish; ventral dark brown, inner ray whitish. Caudal brownish to dark brown distally. Two white blotches present on sides in juveniles, one below 8th dorsal spine and the other below posterior dorsal rays.

Local names: *Rymas* (Minicoy). *Pulariam* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and beyond to Tahiti and Tuamotu Islands.

256. *Lutianus vaiensis* (Quoy and Gaimard)

Diaope vaiensis Quoy and Gaimard, Voy. *Uranie*, Zoology, p. 307, 1824.

Lutianus marginatus Day, Fishes of India, p. 44, pl. 13, fig. 5, 1878.

Lutianus vaiensis Smith, Fishes of Southern Africa, p. 256, pl. 38, fig. 669, 1949. Smith and Smith, Fishes of Seychelles, p. 27, pl. 23, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 95/204).

Lutianus vaiensis Munro, Fishes of Ceylon, p. 137, pl. 25, fig. 389, 1955.

Lutianus vaiensis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 275, 1936.

Specimens studied: Minicoy (11), 47 to 130 mm.

D. X, 13-14; A. III, 8; P. ii, 13-14; V. I, 5. Ll. 49-50; Ltr. 7+1+16-17. GR. 5-6+1+9-10.

Head 2.5-2.6 in standard length, 3.2-3.3 in total length. Depth of body 2.5-2.7 in standard length, 3.2-3.4 in total length. Eye 4.0-4.3 in head, 1.3-1.5 in snout and 0.9 in interorbital space. Maxillary reaching to below front border of pupil. Narrow bands of teeth in jaws, outer row enlarged, those in front of upper jaw moderate canines. A triangular patch of teeth on vomer and in an elongate band on palatines. Preoperculum denticulate with a well developed notch.

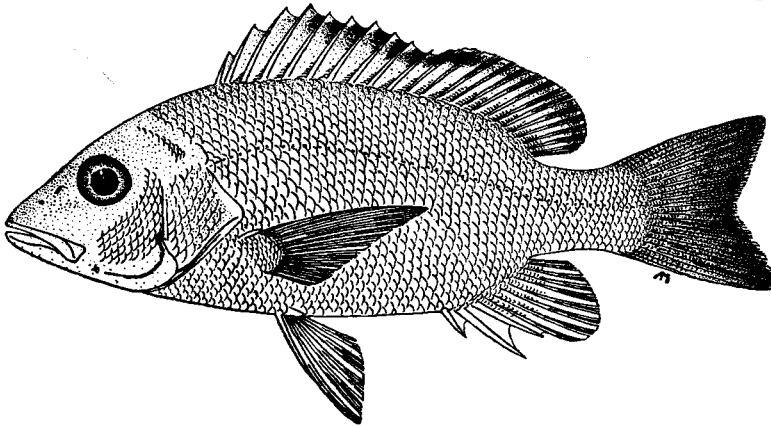


FIG. 256. *Lutianus vaigiensis* (Quoy and Gaimard), 130 mm.

Scales on head beginning behind a level from eye, supratemporal band distinct. Six rows of scales on preoperculum, its inferior and hind border naked. Scales above lateral line in oblique rows, those below lateral line in longitudinal rows. Fourth dorsal spine longest, slightly less than postorbital length of head. Second anal spine longer than the third and as long as longest dorsal spine. Pectoral shorter than head by half length of snout. Ventral shorter than head without snout. Colour: Brownish grey on back, whitish below; 7.8 yellow longitudinal bands on sides in fresh specimens. Dorsal pale yellowish basally, becoming blackish towards margin and narrowly edged with white. Anal, pectoral and ventral pale yellowish. Caudal dark brown, hind border narrowly white.

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Ryukyus, Japan, Australia, New Hebrides and east to Tuamotu and Marquesas Islands.

257. *Aprion virescens* Valenciennes

Aprion virescens Cuvier and Valenciennes, Hist. Nat. Poissons, 6, p. 544, pl. 168, 1830. Smith, Fishes of Southern Africa, p. 251, fig. 652, 1949. Munro, Fishes of Ceylon, p. 134, pl. 24, fig. 377, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat No. CMFRI-LA-F. 95/205).

Aprion (*Aprion*) *virescens* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 311, 1936.

Specimens studied: Bangaram (1), 345 mm. Kavarathi (1), 417 mm. Minicoy (4), 280 to 332 mm. Pitti (1), 385 mm.

D. X, 11; A. III, 8; P. ii, 15-16; V. I, 5. Ll. 48-50; Ltr. 7+1+17-18. GR. 7-8 +1+13-14.

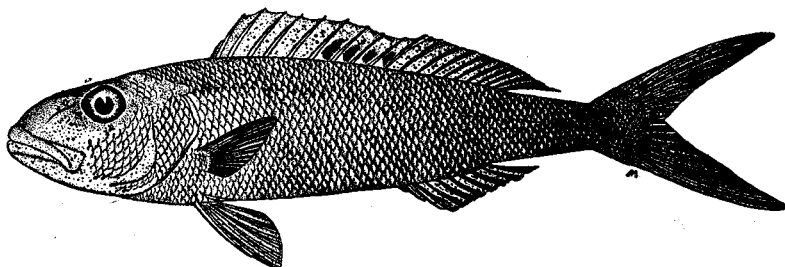


FIG. 257. *Aprion virescens* Valenciennes, 332 mm.

Head 3.1-3.3 in standard length, 3.9-4.1 in total length. Depth of body 3.8-4.2 in standard length, 4.8-5.4 in total length. Eye 4.2-4.5 in head, 1.7-1.9 in snout and 1.5 in flat interorbital space. Maxillary almost reaching to below front border of eye. Villiform teeth in bands in jaws, an outer series of conical teeth with two canine like teeth anteriorly in each jaw. Teeth present on vomer and palatines. Posterior and inferior limb of preopercle naked. Edges of preoperculum smooth. Dorsal spines flexible, middle spines longest, as long as length of snout. Dorsal and anal fins pointed behind. Pectoral short, equal to or a little longer than snout. Ventral half length of head or slightly longer. Colour: Greenish brown on back, lighter below. Dorsal, anal and caudal brownish; a series of violet blotches basally between posterior dorsal spines and anterior dorsal rays. Pectoral yellowish; ventral yellowish with brownish tip.

Local names: *Gilolu* (Minicoy). *Chevidukallan* (other islands).

Distribution: East coast of South Africa, Seychelles, Mauritius to the Laccadives, Ceylon, Indonesia, Philippines and Okinawa, Society, Tuamotu and Hawaiian Islands and south to Queensland.

258. *Aphareus furcatus* (Lacépède)

Labrus furcatus Lacépède, Hist. Nat. Poissons, 3, pp. 429 and 447, pl. 21, fig. 1, 1802.

Aphareus furcatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 318, 1936. Munro, Fishes of Ceylon, p. 139, pl. 26, fig. 399, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Smith and Smith, Fishes of Seychelles, p. 27, pl. 24, I, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMERI-LA-F. 95/206).

Specimens studied: Agathi (2), 138 and 190 mm. Minicoy (4), 213 to 240 mm.

D. X, 11; A. III, 8; P. ii, 14; V. I, 5. Ll. 70-73; Ltr. 9 + 4 + 20. GR. 7 + 1 + 16-17.

Head 3.0-3.1 in standard length, 3.9-4.1 in total length. Depth of body 3.1-3.2 in standard length, 4.0-4.2 in total length. Eye 4.3 in head, 1.3-1.4 in snout and 1.4 in convex interorbital space. Maxillary reaching to below hind border of eye. Bands of small teeth in jaws, outer row somewhat larger. Vomer and palatines edentulous. Preopercle margin smooth without notch. Preoperculum with 8 rows of scales, its posterior and inferior limb naked. First spine of dorsal less than half length of second, it being shorter than third. Last dorsal and anal rays produced. Pectoral slightly longer than head without snout. Ventral equal to postorbital length of head plus half eye diameter. Colour: Slightly brownish olive, little pale on lower sides, naked areas of head darker. Dorsal, anal and caudal slightly dusky; edge of spinous dorsal darker.

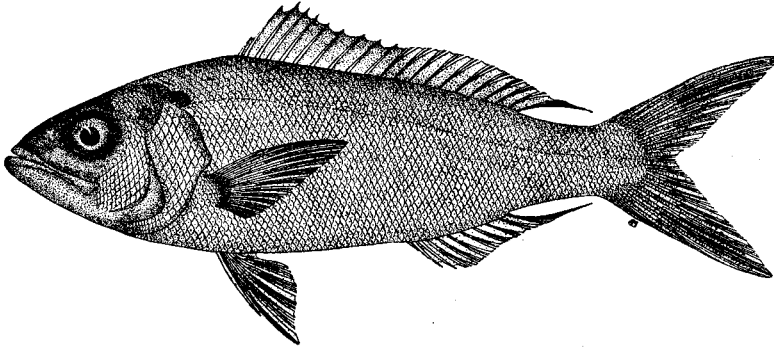


FIG. 258. *Aphareus furcatus* (Lacépède), 213 mm.

Local names: *Gilolu* (Minicoy). *Kannithodakki nakara* (Agathi).

Distribution: Tropical Indo-Pacific from Mauritius, Reunion and Seychelles in the Western Indian Ocean to the Laccadives, Ceylon, Indonesia, Philippines, Japan and Society and Hawaiian Islands.

Family CAESIODIDAE

Rather elongate body with moderate scales. Teeth fine, in one or more rows in jaws, none on palate. A single dorsal consisting of slender spines anteriorly and soft rays posteriorly. A bony process on premaxilla sliding beneath the maxilla. Lateral line complete. Supra-temporal band of scales separate from those of the back. Axillary process at base of ventrals present.

1. Two processes on each side of premaxillary in addition to the median ascending process. Vomer and palatines edentulous 2

A single process on each side of premaxillary in addition to the median ascending process. Vomer with teeth 5

2. Dorsal fin without scales. Ll. 76-82. Depth of body 5.1-5.5
..... *Gymnocaesio argenteus*
Dorsal fin with scales on membranes and on rays basally. Depth of body less than 4.6 3
3. Dorsal XI-XII, 18-21. Pectoral ii, 21-22. A dark band in each lobe of caudal
..... *Caesio tile*
Dorsal X, 14-15. Pectoral ii, 18-19. Tips of caudal lobes blackish 4
4. 7 scales above lateral line and 14 or 15 below. Brown above, whitish below and without lateral band *Caesio pisang*
8 scales above lateral line and 16 below. A pale yellowish lateral band present
..... *Caesio chrysozona*
5. A blackish band along each lobe of caudal. Depth of body 3.4-3.8. Sides with yellowish longitudinal band *Caesio coerulaureus*
No blackish band on caudal lobes. Depth 3.0-3.3. A reddish brown lateral band tapering to base of caudal *Caesio xanthonotus*

259. *Gymnocaesio argenteus* (Bloch)

Bodianus argenteus Bloch, Naturges. Ausland. Fische, 4, p. 57, pl. 231, fig. 2, 1790.

? *Caesio gymnipterus* Bleeker, Nat. Tijds. Ned.-Ind., 10, p. 372, 1856.

? *Gymnocaesio gymnipterus* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 316, fig. 67, 1936. Smith and Smith, Fishes of Seychelles, p. 29, pl. 94, A, 1963.

Gymnocaesio argenteus Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 295, fig. 13, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 104/207).

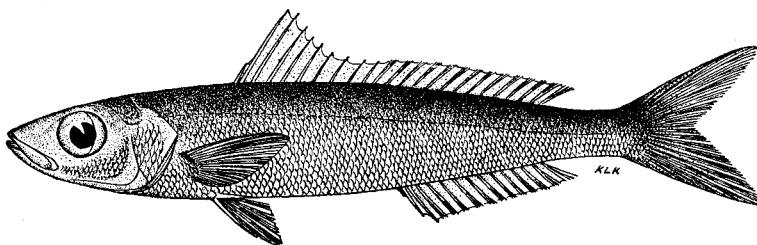


FIG. 259. *Gymnocaesio argenteus* (Bloch), 76 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (142), 43 to 86 mm.

D. X, 14-15; A. III, 12; P. ii, 18-19; V. I, 5. Ll. 76-82; Ltr. 7+1+13.

Head 3.6-3.9 in standard length, 4.3-4.6 in total length. Depth of body 5.1-5.5 in standard length, 6.2-6.6 in total length. Eye 3.3-3.5 in head, 0.9 in snout and 0.8-0.9 in interorbital space. Maxillary reaching below front border of eye. Premaxillary with two processes on each side in addition to the median one. A few minute teeth near symphysis of lower jaw, upper jaw edentulous.

First dorsal spine minute, third longest, slightly longer than postorbital length of head. Supraorbital band of scales 4 scales wide and 11 scales long confluent with that of the other side. First anal spine minute. Pectoral shorter than head without snout. Ventral equal to or slightly longer than postorbital part of head. Dorsal and anal fins without scaly sheath. Colour: Coppery brown, whitish below. Dorsal and caudal pale with brownish tinge, other fins whitish. Axil of pectoral blackish.

Local name: *Dandimugurang* (Minicoy).

Distribution: East coast of Africa to Seychelles, Laccadives, Indonesia, China and Philippines.

260. *Caesio tile* Cuvier

Caesio tile Cuvier and Valenciennes, Hist. Nat. Poissons, 6, p. 428, 1830. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 296, 1936. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 662, fig. 28, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 104/208).

Pterocaesio tile Smith and Smith, Fishes of Seychelles, p. 29, pl. 94, H, 1963.

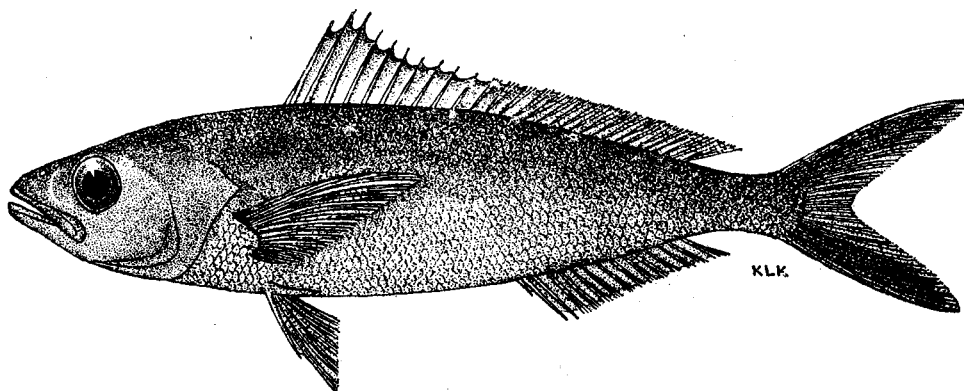


FIG. 260. *Caesio tile* Cuvier, 110 mm.

Specimens studied: Androth (5), 85 to 105 mm. Chetlat (14), 70 to 130 mm. Kavarathi (3), 101 to 108 mm. Minicoy (63), 56 to 142 mm.

D. XI-XII, 18-21; A. 12-13; P. ii. 21-22; V. I, 5. Ll. 72-78; Ltr. 7 +1 +16.

Head 3.4-3.7 in standard length, 4.2-4.5 in total length. Depth of body 3.9-4.3 in standard length, 4.8-5.2 in total length. Eye 3.6-4.2 in head, equal to or slightly longer than snout and 1.1-1.3 in interorbital space. Maxillary reaching almost to below front border of pupil. Two rows of teeth in upper jaw, the outer row enlarged and conical; a single row of teeth in lower jaw and some

inner teeth at symphysis. Supraorbital band of scales 11 scales long and 3-4 scales deep. First dorsal spine small, third longest, equal to or exceeding post-orbital part of head in length. Pectoral half length of snout shorter than head. Ventral shorter, slightly longer than postorbital part of head and half diameter of eye together. Colour: Bluish brown above, sharply differentiated from pale white undersides by a darker longitudinal band on sides along the lower edge of lateral line. Upper edge of pectoral base and axil of pectoral black. Dorsal brownish; pectoral, ventral and anal yellowish. Caudal yellowish with a dark median band in each lobe.

Local names: *Rymugurang* (Minicoy). *Churaichala* (other islands).

Distribution: Seychelles to the Laccadives, Indonesia, Taiwan, Philippines, Caroline Islands, Gilbert, Tonga and Society Islands.

261. *Caesio pisang* Bleeker

Caesio pisang Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 113, 1853. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 302, 1936. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 294, fig. 11, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 104/209).

Pterocaesio pisang Smith and Smith, Fishes of Seychelles, p. 29, pl. 94, F, 1963.

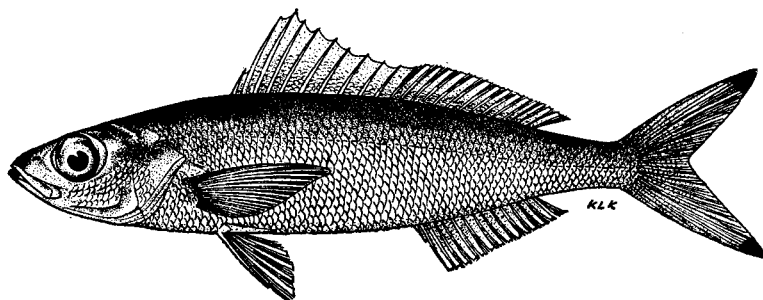


FIG. 261. *Caesio pisang* Bleeker, 84 mm. (after Jones and Kumaran)

Specimens studied: Kavarathi (2), 84 and 112 mm. Minicoy (10), 47 to 94 mm.

D. X, 14-15; A. III, 12; P. ii, 18-19; V. I, 5. Ll. 67-74; Ltr. 7 + 1 + 14 + 15.

Head 3.2-3.5 in standard length, 4.0-4.4 in total length. Depth of body 4.0-4.5 in standard length, 4.9-5.5 in total length. Eye 3.3-3.6 in head, about 0.9 in snout and equal to or slightly less than interorbital space. Maxillary reaching to below front border of eye. A single series of teeth in jaws. Supratemporal band of scales 7-8 scales long and 3-4 scales wide and confluent in the mid-

dorsal line with that of the other side. First dorsal spine small, third or fourth longest, equalling postorbital length of head. Pectoral slightly longer than head without snout. Ventral equal to snout and eye together. Colour: Dark brown above, paler to whitish below. Dorsal pale with brownish tinge; other fins yellowish. Caudal with black tips to each lobe.

Local names: *Hudenmugurang* (Minicoy). *Churaichala* (Kavarathi).

Distribution: East coast of Africa to the Laccadives, Indonesia, Philippines, Taiwan, Japan and Caroline Islands.

262. *Caesio chrysozona* Cuvier

Caesio chrysozona Cuvier and Valenciennes, Hist. Nat. Poissons, 6, p. 440, 1830. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 303, 1936. Jones, Proc. Symposium on Scombroid Fishes, p. 661, fig. 26, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 104/210).

Caesio chrysozona var. *aurolineatus* Day, Fishes of India, p. 95, pl. 24, fig. 5, 1878.

Caesio chrysozonus Munro, Fishes of Ceylon, p. 140, pl. 24, fig. 401, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959.

Pterocaesio chrysozona Smith and Smith, Fishes of Seychelles, p. 29, pl. 95, E, 1963.

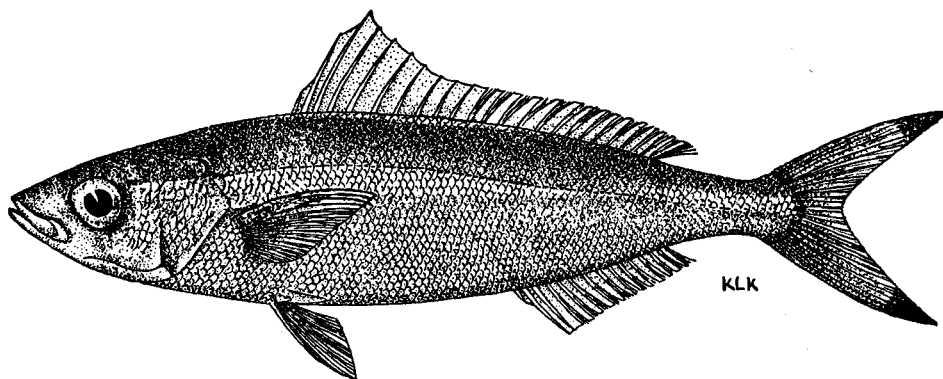


FIG. 262. *Caesio chrysozona* Cuvier, 120 mm.

Specimens studied: Ameni (5), 35 to 75 mm. Kavarathi (8), 42 to 95 mm. Minicoy (46), 32 to 215 mm.

D. X, 15; A. III, 12; P. ii, 18-19; V. I, 5. Ll. 64-73; Ltr. 8+1+16.

Head 3.1-3.5 in standard length, 4.0-4.5 in total length. Depth of body 3.5-3.9 in standard length, 4.4-5.0 in total length. Eye 3.6-4.8 in head, 1.0-1.2 in snout and somewhat less than interorbital space. Teeth in a single series in jaws with additional one or two irregular rows in front in lower jaw. Supratemporal band of scales 9 scales long and 3-5 scales wide confluent with that

of the other side at mid-dorsal line. Maxillary reaching below front border of eye or slightly behind. First dorsal spine short, third longest, equal to or slightly longer than postorbital part of head. Pectoral equal to head without snout or longer. Ventral slightly more than postorbital part of head. Colour: Upper part of body bluish brown, silvery below with an indistinct pale yellowish median band from eye to caudal base. Axil of pectoral dark brown. Vertical fins pale yellowish; tips of caudal lobes blackish.

Local names: *Mugurang*, *Furrua* (Minicoy). *Churaichala* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Indonesia, Philippines, Ryukyu Islands, Japan and Solomon Islands.

263. *Caesio coerulaureus* Lacépède

Caesio coerulaureus Lacépède, Hist. Nat. Poissons, 3, p. 85, 1802. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 306, 1936. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 660, fig. 35, (1962) 1964, Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 104/211).

Caesio caerulaureus Smith, Fishes of Southern Africa, p. 261, pl. 41, fig. 687, 1949. Munro, Fishes of Ceylon, p. 140, pl. 24, fig. 402, 1955.

Specimens studied: Agathi (7), 55 to 71 mm. Ameni (1), 45 mm. Kalpeni (11), 75 to 230 mm. Kavarathi (6), 94 to 235 mm. Minicoy (88), 42 to 146 mm.

D. X, 14-15; A. III, 12; P. ii, 19-20; V. I, 5. Ll. 65-73; Ltr. 7+1+16.

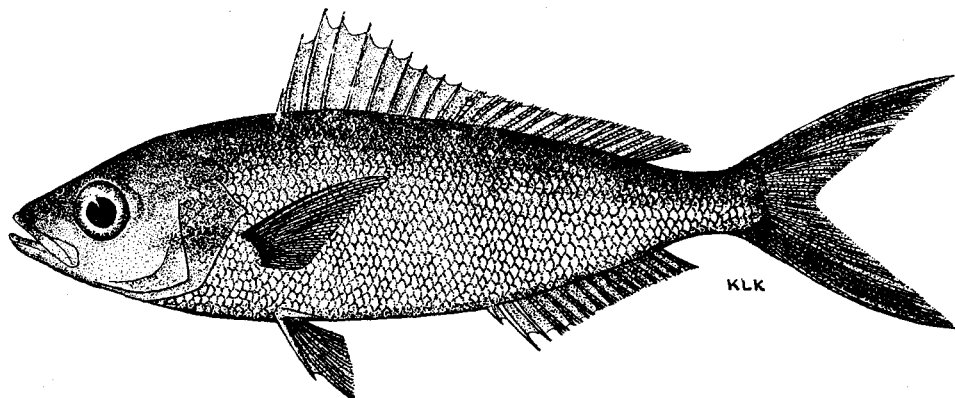


FIG. 263. *Caesio coerulaureus* Lacépède, 120 mm.

Head 3.0-3.4 in standard length, 3.8-4.3 in total length. Depth of body 3.4-3.8 in standard length, 4.3-4.7 in total length. Eye 3.4-4.8 in head, 1.0-1.3 in snout and 1.0-1.4 in interorbital space. Maxillary reaching below front border of eye. A single series of conical teeth in jaws with a few smaller teeth in an

inner row at symphysis. Supratemporal band of scales 3 scales wide and 10-12 scales long almost confluent with that of the other side. First dorsal spine minute, third and fourth spines subequal, equal to or slightly longer than snout and eye. Pectoral half length of snout shorter than head, ventrals, as long as or slightly longer than postorbital length of head. Colour: Bluish brown above, pale silvery below with a wide yellowish longitudinal band on sides just above lateral line. In very large specimens 4 or 5 pale yellowish bands present in some in addition to the above. Dorsal greyish, margin little darker. Other fins yellowish. Each caudal lobe with a broad blackish median band. Axil of pectoral blackish, upper edge of base with a triangular black mark.

Local names: *Kekkurimugurang*, *Furrua* (Minicoy). *Churaichala* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, Indonesia, Philippines, China,¹ Ryukyus, Japan, New Herbrides, Australia and Samoan and St. Cruz Islands.

264. *Caesio xanthonotus* Bleeker

Caesio xanthonotus Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 466, 1853. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 301, 1936. Smith and Smith, Fishes of Seychelles, p. 29, pl. 95, F, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 295, fig. 12, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 104/211).

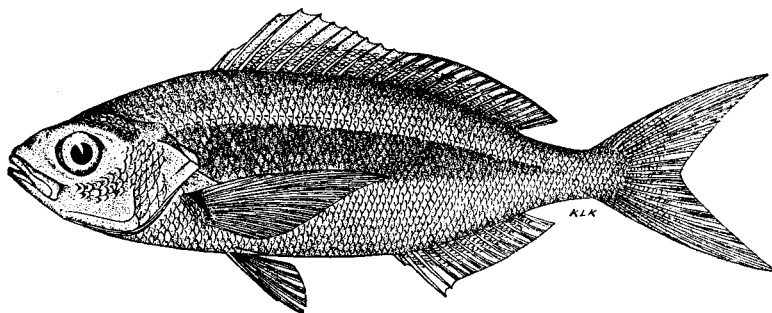


FIG. 264. *Caesio xanthonotus* Bleeker, 144 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (12), 45 to 181 mm.

D. X, 14-15; A. III, 12; P. ii, 19; V. I, 5. Ll. 60-63; Ltr. 6+1+17.

Head 3.1-3.2 in standard length, 4.0-4.1 in total length. Depth of body 3.0-3.3 in standard length, 3.9-4.2 in total length. Eye 3.7-4.4 in head, slightly longer than snout and about 1.2 in interorbital space. Maxillary reaching below posterior to front border of eye. Teeth in two rows in jaws; outer row enlarged;

a few minute teeth on vomer and sometimes on palatines. Pectoral slightly longer than head. Ventral equal to postorbital part of head. Temporal band of scales 3 scales wide, 10 scales long interrupted by narrow scaleless interspace at mid-dorsal line. First dorsal spine small, third longest, equal to postorbital part of head. Colour: Light bluish brown on back, yellowish along lateral line, a broad reddish brown band below lateral line from head tapering to base of median caudal rays, lower sides pale to pinkish. Axil of pectoral brown, upper edge of pectoral base dark. Dorsal pale yellowish, dusky distally. Other fins yellowish.

Local name: *Donkevumas* (Minicoy).

Distribution: Seychelles, Laccadives, Indonesia, Philippines, Indo-China, and Marianas, Solomon and Marshall Islands.

Family LOBOTIDAE

Body rather deep. Mouth fairly large, oblique. Preoperculum serrated. Fine teeth in bands in each jaw, with the outer series enlarged; vomer and palatines edentulous. A single dorsal fin, the anterior part with XII strong spines and the posterior part of 13-17 branched rays. Anal with III spines and 8-11 rays. Scales moderate, weakly ctenoid, those on head and base of vertical fins smaller. Lateral line arched.

265. *Lobotes surinamensis* (Bloch)

Holocentrus surinamensis Bloch, Naturges. Ausland. Fische, 4, p. 98, pl. 243, 1790.

Lobotes surinamensis Day, Fishes of India, p. 84, pl. 21, fig. 5, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 459, fig. 91, 1936. Smith, Fishes of Southern Africa, p. 188, fig. 414, 1949. Munro, Fishes of Ceylon, p. 142, pl. 26, fig. 407, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 104/212).

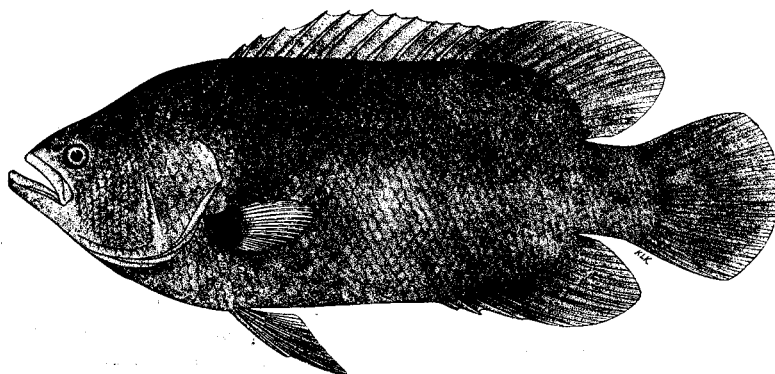


FIG. 265. *Lobotes surinamensis* (Bloch), 234 mm.

Specimens studied: Minicoy (3), 190 to 298 mm.

D. XII, 15; A. III, 11; P. 16; V. I, 5. Ll. 44-45; Ltr. 9+1+20.
GR. 6-7+1+13-14.

Head 2.8-3.0 in standard length, 3.5-3.8 in total length. Depth of body 2.3-2.4 in standard length, 2.9-3.0 in total length. Eye 7.4-7.7 in head, 1.3-1.4 in snout and 2.2-2.3 in convex interorbital space. Maxillary almost reaching below hind border of eye. Bands of villiform teeth in jaws with an outer series of conical teeth. Preoperculum dentate, those above angle larger. Dorsal rays higher than longest dorsal spines and slightly longer than those of anal. Pectoral equal to half length of head or slightly longer. Ventral equal to postorbital length of head. Caudal rounded. Colour: Dark brown, lower side of head and chest pale yellowish. Fins dark brownish, distal 3/4 of pectoral and margin of pectoral yellowish.

Local name: *Naharidathimas* (Minicoy).

Distribution: East coast of Africa to Minicoy, coasts of India, Ceylon and Indonesia, Philippines, China, Japan, south to Australia, Atlantic coast of tropical America and Mediterranean.

Family GERRIDAE

Body compressed, oblong or oval. Mouth protractile, downwards; small teeth in jaws; vomer and palatines edentulous. Preoperculum entire, lower border sometimes denticulate. Four gills. Gill membranes not united with isthmus. Six branchiostegals. Pseudobranchiae present. Spinous dorsal with IX-X spines and 10-15 rays. Anal with III-VI spines and 10-13 rays. Dorsal and anal scaly. Scales moderate; lateral line complete.

1. Second dorsal spine produced into a filament, generally greater than depth of body *Gerres filamentosus*
Second dorsal spine not produced, much less than depth of body 2
2. Depth of body 3.0-3.4 in length *Gerres oblongus*
Depth of body less than 3 in length 3
3. Eye diameter 2.7-3.0 in head. 5 dusky cross bands on upper sides. Membrane between second and fifth or sixth dorsal spines black distally *Gerres lucidus*
Eye diameter 3.4-3.7 in head. No dark cross bars. Spinous dorsal slightly dusky terminally *Gerres oyena*

266. *Gerres filamentosus* Cuvier

Gerres filamentosus Cuvier, Regne Animal, ed. 2, 2, p. 188, 1829. Day, Fishes of India, p. 98, pl. 25, fig. 3, 1878. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 99/216).

Gerres punctatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 349, fig. 73, 1931. Smith, Fishes of Southern Africa, p. 244, fig. 628, 1949.

Pertica filamentosa Munro, Fishes of Ceylon, p. 143, pl. 28, fig. 411, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959.

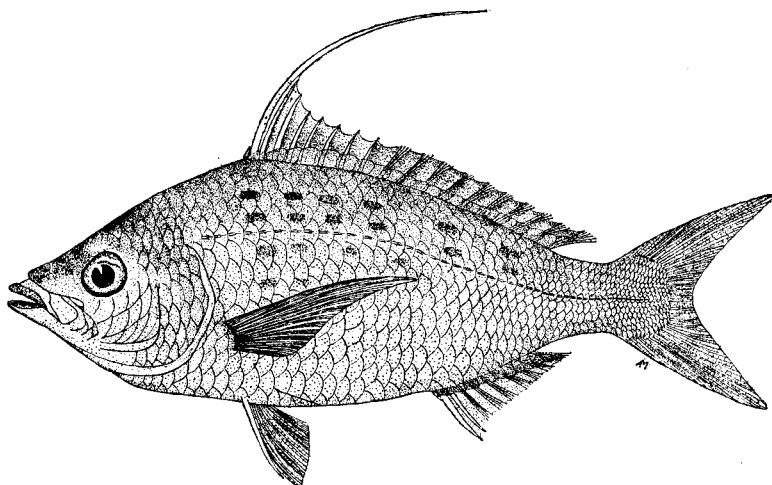


FIG. 266. *Gerres filamentosus* Cuvier, 175 mm.

Specimens studied: Agathi (3), 173 to 197 mm. Ameni (2), 59 and 61 mm. Kadamat (1), 175 mm. Minicoy (6), 67 to 153 mm.

D. IX, 10; A. III, 7; P. 15-16; V. I, 5. Ll. 43-47; Ltr. 5-6 +1+12-13.

Head 2.9-3.2 in standard length, 3.8-4.3 in total length. Depth of body 2.3-2.5 in standard length, 3.1-3.5 in total length. Eye 3.3-3.8 in head, 1.0-1.2 in snout and also in interorbital space. Maxillary reaching to below front border of eye. Lower pharyngeals united by mobile suture. Distance from tip of snout to dorsal origin a little more than height of body. Second dorsal spine often produced into a filament in large specimens. 2nd and 3rd anal spines subequal. Pectoral a little longer than length of head. Ventral shorter than head without snout. Colour: Light bluish grey above, becoming silvery on sides and below, with several oblong bluish spots on upper part of body in large adults. Fins pale yellowish, soft dorsal and caudal narrowly edged with dark.

Local names: *Sala*, *Uniyamas* (Minicoy). *Kodiyampurachi* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Taiwan, Japan, New Britain and Australia.

267. *Gerres oblongus* Cuvier

Gerres oblongus Cuvier and Valenciennes, Hist. Nat. Poissons, 6, p. 479, 1830. Day, Fishes of India, p. 98, pl. 25, fig. 2, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 352, 1931. Smith, Fishes of Southern Africa, p. 245, 1949. Munro, Fishes of Ceylon, p. 143, pl. 28, fig. 412, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 301, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 99/217).

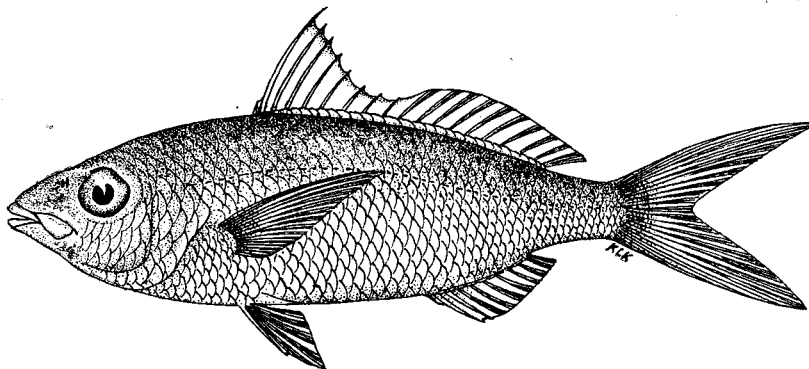


FIG. 267. *Gerres oblongus* Cuvier, 115 mm.

Specimens studied: Agathi (13), 50 to 105 mm. Ameni (3), 52 to 90 mm. Bitra (8), 45 to 100 mm. Chetlat (10), 31 to 110 mm. Kadamat (6), 40 to 85 mm. Kalpeni (1), 112 mm. Kavarathi (12), 95 to 104 mm. Minicoy (18), 40 to 135 mm. Suheli (1), 61 mm.

D. IX, 10; A. III, 7; P. 16-17; V. I, 5. Ll. 46-49; Ltr. 5+1+10-11.

Head 2.9-3.3 in standard length, 4.0-4.4 in total length. Depth of body 3.0-3.4 in standard length, 4.1-4.5 in total length. Eye 3.2-3.7 in head, 1.0-1.2 in snout and also in interorbital space. Maxillary reaching to below front edge of eye. Lower pharyngeals united by mobile suture. Distance from tip of snout to dorsal origin more than height of body and much less than length of spinous dorsal and soft dorsal together. Second spine of dorsal as long as head without snout. Second anal spine stronger, slightly more than eye diameter. Pectoral equal to or a little longer than head. Colour: Upper sides grey, sides and beneath silvery. Fins pale yellowish. Dorsal often with narrow dark margin. Young specimens darker above or with indistinct dark cross bands.

Local names: *Sala* (Minicoy). *Purachi* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India and Ceylon, Indonesia, Philippines, New Caledonia, Fiji and Samoan Islands.

268. *Gerres lucidus* Cuvier

Gerres lucidus Cuvier and Valenciennes, Hist. Nat. Poissons, 6, p. 477, 1830. Day, Fishes of India, p. 99, pl. 25, fig. 5, 1878. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 99/218).

Gerreomorpha setifer Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959 (not of Hamilton Buchanan).

Gerres setifer Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 358, 1931 (synonymy in part).

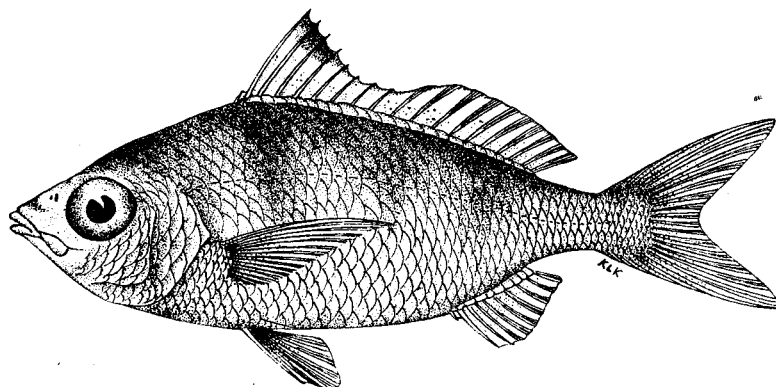


FIG. 268. *Gerres lucidus* Cuvier, 62 mm.

Specimens studied: Minicoy (10), 31 to 65 mm.

D. IX, 10; A. III, 7; P. 15; V. I, 5. Ll. 39-40; Ltr. 5+1+10.

Head 2.8-3.0 in standard length, 3.7-3.9 in total length. Depth of body 2.6-2.8 in standard length, 3.4-3.6 in total length. Eye 2.7-3.0 in head, slightly more than snout and interorbital space. Maxillary reaching beyond front border of eye. Second dorsal spine about less than half height of body. Pectoral equal to or slightly longer than head. Ventral much shorter than head without snout. Third anal spine as long as diameter of eye. Colour: Brownish grey above, silvery below with 5 indistinct darker cross bands on back. Upper part of membrane between 2nd and 5th or 6th dorsal spines black, rest of the dorsal edged dusky; other fins pale.

Local name: *Hakkisala* (Minicoy).

Distribution: Laccadives, coasts of India and Ceylon to Malaysia, Indonesia and Hongkong.

269. *Gerres oyena* (Forskål)

Labrus oyena Forskål, Descript. Animal., p. 35, 1775.

Gerres acinaces Day, Proc. Zool. Soc. London, p. 698, 1870. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 355, 1931.

Gerres oyena Day, Fishes of India, p. 99, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 345, 1931. Munro, Fishes of Ceylon, p. 144, pl. 28, fig. 414, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 116, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 99/219).

Specimens studied: Bitra (3), 60 to 67 mm. Kadamat (4), 65 to 85 mm. Minicoy (8), 65 to 200 mm.

D. IX, 10; A. III, 7; P. i, 14-15; V. I, 5. Ll. 38-42; Ltr. 5+1+11.

Head 2.9-3.2 in standard length, 3.8-4.5 in total length. Depth of body 2.4-2.8 in standard length, 3.3-3.8 in total length. Eye 3.4-3.7 in head, 1.0-1.2 in snout and 1.1-1.3 in interorbital space. Maxillary reaching to below front border of eye. Angle of preoperculum rounded. Lower pharyngeals united by mobile suture. Depth of body less than distance from tip of snout to dorsal origin. Scales reaching nearly to nostrils. Second dorsal spine longest, as long as head without snout. Last dorsal spines shorter than the following rays. Second anal spine slightly shorter than postorbital length of head. Pectoral longer than head, reaching vertical through anal origin. Colour: Silvery white, back grey; spinous dorsal dusky terminally.

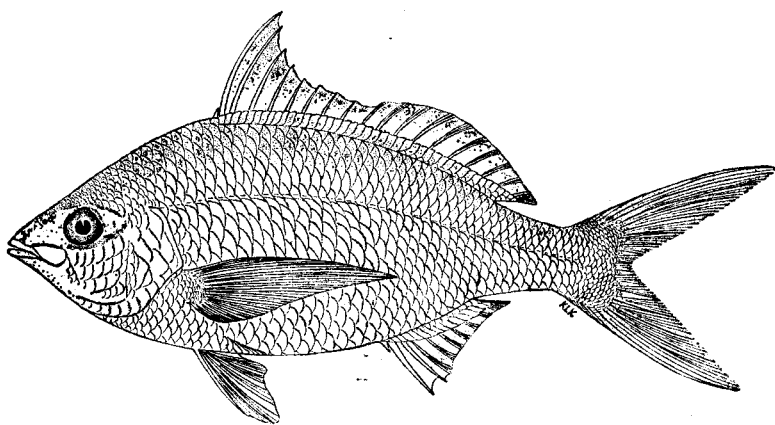


FIG. 269. *Gerres oyena* (Forskål), 160 mm.

Local names: *Uniyamas* (Minicoy). *Purachi* (other islands).

Distribution: From the Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, China, Japan, south to Australia and eastwards to Fiji, Caroline and Ellice Islands.

Family LEIOGNATHIDAE

Oblong-ovate, compressed. Top of head with bony ridges and a nuchal spine. Mouth small, horizontal or oblique and highly protrusible. Teeth usually small, sometimes a few canines; palatines edentulous. Five branchiostegals. Gill membranes united with isthmus. Scales thin, minute; head and breast often naked. Lateral line complete.

Minute teeth in a single series in jaws. Second dorsal spine elongated, longer than head *Leiognathus fasciatus*

Teeth in upper jaw sharp, in lower jaw curved and pointed and a distinct canine on each side of symphysis of both jaws *Gazza minuta*

270. *Leiognathus fasciatus* (Lacépède)

Clupea fasciata Lacépède, Hist. Nat. Poissons., 5, pp. 460 and 463, 1803.

Equula fasciata Day, Fishes of India, p. 243, pl. 51 C, fig. 2, 1878.

Leiognathus fasciatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 320, 1931. Munro, Fishes of Ceylon, p. 145, pl. 27, fig. 419, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 98/220).

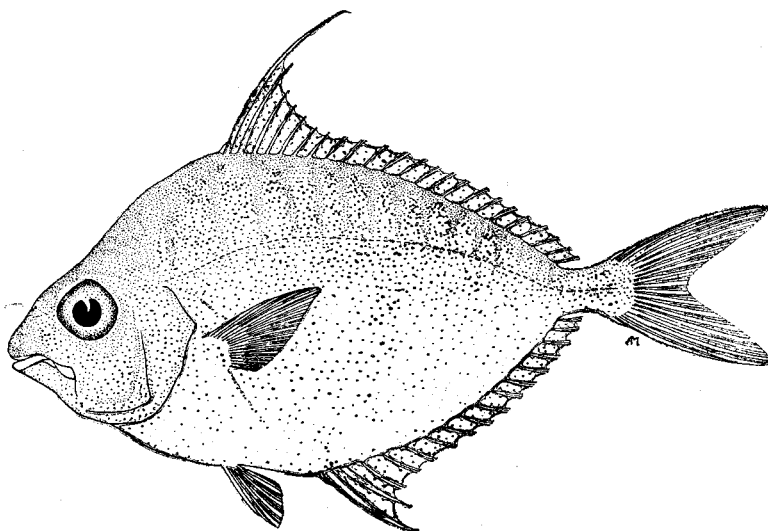


FIG. 270. *Leiognathus fasciatus* (Lacépède), 66 mm.

Specimens studied: Minicoy (7), 46 to 66 mm.

D. VIII, 16; A. III, 14; P. ii, 15-16; V. I, 5. Ll. 62-65. GR. 3-4+1+14.

Head 3.0-3.2 in standard length, 4.0-4.2 in total length. Depth of body 1.8-2.0 in standard length, 2.4-2.6 in total length. Ovate, deeply compressed, nape steeply convex. Eye 2.9-3.1 in head, about 0.9 in snout and equal to inter-orbital space. Lower margin of preopercle almost straight and finely denticulate.

Maxillary reaching to below front border of iris. Mouth small, forming a downwardly directed tube when protracted. Mandible concave below. Teeth in a single series in upper jaw and in villiform bands in lower jaw. Head naked. Scales minute, those on breast very thin and indistinct. Second spine of dorsal elongated, flexible, longer than head. Second anal spine equal to snout and eye together. Pectoral as long as head without snout. Colour: Grey above, silvery white below. Axil of pectoral brown. Fins hyaline.

Local name: *Mullan* (Minicoy).

Distribution: Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Queensland and Fiji and Samoan Islands.

271. *Gazza minuta* (Bloch)

Scomber minutus Bloch, Ichthyologie, p. 110, pl. 429, fig. 2, 1797.

Gazza aequulaeformis Day, Fishes of India, p. 244, 1878.

Gazza minuta Day, Fishes of India, p. 244, pl. 53, fig. 1, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 339, figs. 71 and 72, 1931. Smith, Fishes of the Southern Africa, p. 244, pl. 35, fig. 627, 1949. Munro, Fishes of Ceylon, p. 147, pl. 27, fig. 425, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 98/221).

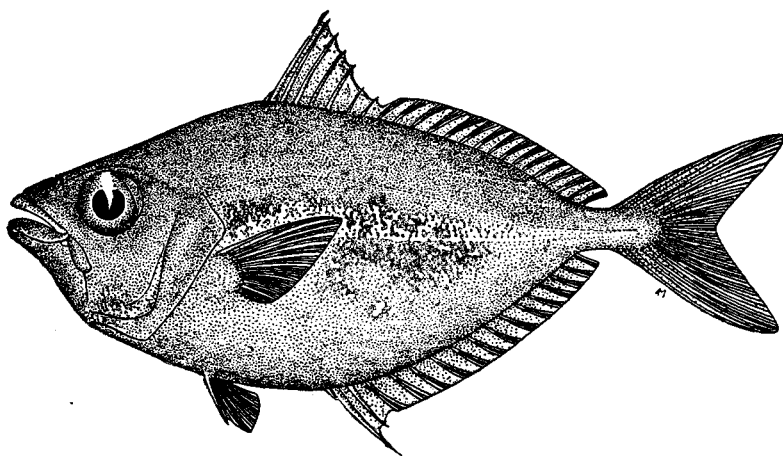


FIG. 271. *Gazza minuta* (Bloch), 99 mm.

Specimens studied: Kalpeni (1), 99 mm. Suheli (1), 97 mm.

D. VIII, 16; A. III, 14; P. i, 14-15; V. I, 5. Ll. about 60. GR. 3-4+1+14.

Head 2.9 in standard length, 3.6 in total length. Depth of body 2.2-2.3 in standard length, 2.7-2.8 in total length. Eye 3.0-3.2 in head, slightly more than snout and also in interorbital space. Mouth protractile, maxillary reaching

to below anterior third of eye. Teeth in upper jaw sharp, in a single series with a canine on each side at symphysis. Lower jaw with a series of curved pointed teeth and a pair of symphyseal canines with a notch between them. Supraorbital ridges rough. Scales very small and barely visible. Head and a triangular area between pectoral, operculum and anal base naked. Preopercle rounded, its lower margin finely serrated. Second spine of dorsal slightly shorter than snout and eye. Second anal spine slightly shorter but stronger. Ventral with an axillary scaly process. Colour: Dusky on back, becoming silvery white on sides and below. Axil of pectoral brownish. Fins hyaline; membrane of spinous dorsal slightly dusky at tip.

Distribution: Widely distributed from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Australia and eastwards to Solomon and Tahiti Islands.

Family MENIDAE

Strongly compressed with an almost angulated ventral profile. Mouth highly oblique, intermaxillaries protrusible. Villiform teeth in jaws. Gill openings wide. Gill membranes free and not united with isthmus. A single dorsal and anal fin. Ventral fin close to anal fin, first ray produced. Scales minute; lateral line almost parallel to dorsal profile and terminating below posterior dorsal rays.

272. *Mene maculata* (Bloch and Schneider)

Zeus maculatus Bloch and Schneider, Syst. Ichth., p. 95, pl. 22, 1801.

Mene maculata Day, Fishes of India, p. 249, pl. 53, fig. 5, 1878. Smith, Fishes of Southern Africa, p. 242, pl. 35, fig. 623, 1949. Munro, Fishes of Ceylon, p. 132, pl. 24, fig. 374, 1955. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 309, 1931.

D. III-IV, 40-43; A. 30-33; V. I, 5.

Body strongly compressed, disc-like, breast sharp. Head 3.4-3.8, depth of body 1.3-1.4, both in standard length. Eye 3.0-3.5 in head, 1.0-1.4 in snout and 0.8 in interorbital space. Mouth protruding upwards. Teeth villiform, palatines edentulous. Preoperculum and operculum entire. Dorsal profile scarcely convex, ventral profile highly convex. Dorsal fin highest anteriorly. Pectoral as long as head without snout. Ventral thoracic, its first spine short, first ray filiform. Colour: Bluish above, sides and belly silvery white. Two or three rows of dark spots above and below lateral line. Dorsal, caudal and ventral dusky. Pectoral and anal hyaline.

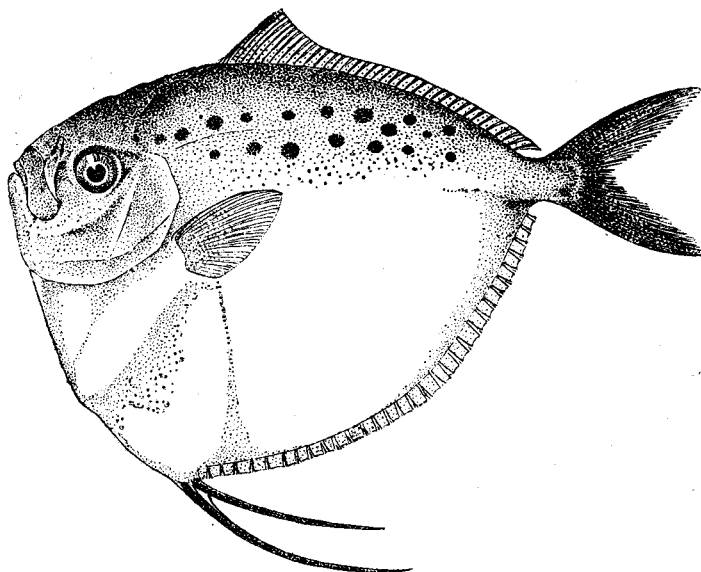


FIG. 272. *Mene maculata* (Bloch and Schneider). (after Day)

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Malaysia, Philippines, north to China and Japan and south to Australia.

Note: One specimen was collected from Minicoy in 1966 but it was lost.

Family POMADASYIDAE

Body oblong and compressed. Mouth moderate; teeth conical, in narrow bands, outer series sometimes enlarged. A pit below the chin. Preoperculum serrated. Dorsal fin with XI to XV strong spines and 12 to 18 branched rays. Anal with three strong spines and 7 or 8 branched rays. Seven branchiostegals. Gill membranes not attached to isthmus. Pseudobranchiae present. Scales moderate, ctenoid. Lateral line complete, convexly curved anteriorly.

273. *Pomadasys maculatus* (Bloch)

Anthias maculatus Bloch, Naturges. Ausl. Fische, 7, p. 7, pl. 326, fig. 2, 1797.

Pomadasys maculatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 400, 1936. Smith, Fishes of Southern Africa, p. 258, pl. 40, fig. 677, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 108/222).

Pristipoma maculatum Day, Fishes of India, p. 74, pl. 19, fig. 5, 1878.

Specimens studied: Kalpeni (2), 82 and 87 mm.

D. XII, 14; A. III, 8; P. ii, 15; V. I, 5. Ll. 53-54; Ltr. 6+1+15.

Head equal to depth of body, 2.9-3.0 in standard length, 3.6-3.7 in total length. Eye 3.4 in head, 0.8 in snout and also in interorbital space. Maxillary reaching nearly to below front of iris. Teeth pointed in narrow bands in jaws, outer series enlarged. Scales on head reaching almost to hind nostril. Hind border of preoperculum concave and serrated. Dorsal spines increasing in length to the fourth, it being as long as snout and eye together, subsequent spines gradually decreasing in length, last two spines subequal. Second anal spine longer than third, about 1.5 eye diameter. Pectoral as long as head. Ventral equal to head without snout. Hind border of caudal fin concave. Colour: Silvery white with five broad dark brown oblique cross bands on back not reaching to the middle of sides, the first on nape, the second below middle dorsal spines, the third below posterior dorsal spines, the fourth below middle rays of dorsal and the fifth on caudal peduncle. Dorsal fin dusky distally, a large black blotch between fourth and seventh dorsal spines. Pectoral, ventral and anal yellowish. Caudal slightly dusky distally.

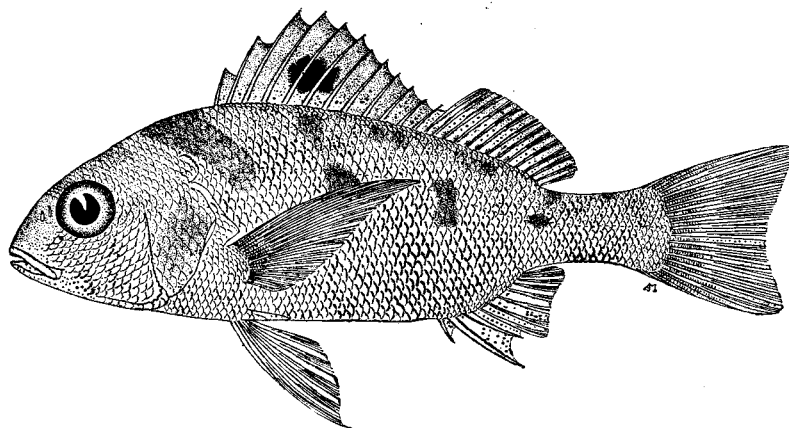


FIG. 273. *Pomadasys maculatus* (Bloch), 87 mm.

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Taiwan and south to Queensland.

Family SCOLOPSIDAE

Oblong, slightly compressed. Mouth moderate, somewhat protractile. Teeth feeble, in narrow bands in jaws, the outer series enlarged. Five or six branchiostegals. Gill membranes not attached to isthmus. Dorsal fin single, spinous part with ten spines and nine divided rays. Anal with three spines and seven divided rays. Suborbital spinate. Preoperculum serrated. Operculum with one spine. Scales fairly large, ctenoid; lateral line complete and convexly curved.

274. *Scolopsis bilineatus* (Bloch)

Anthias bilineatus Bloch, Naturges. Ausland. Fische, 7, p. 3, pl. 325, fig. 1, 1793.

Scolopsis bilineatus Day, Fishes of India, p. 85, pl. 22, fig. 3, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 339, 1936. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 105/223).

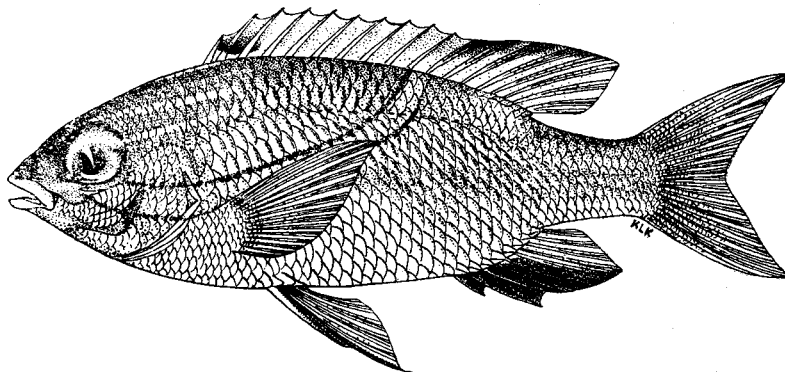


FIG. 274. *Scolopsis bilineatus* (Bloch), 130 mm.

Specimens studied: Bitra (4), 120 to 133 mm.

D. X, 9; A. III, 7; P. ii, 14-15; V. I, 5. Ll. 45-46. Ltr. 4+1+15.

Head 3.1-3.3 in standard length, 3.9-4.2 in total length. Depth of body 2.8-2.9 in standard length, 3.5-3.6 in total length. Eye 2.7-2.8 in head, 0.7 in snout and 0.9 in interorbital space. Maxilla reaching to below front edge of eye. Suborbital with a strong backwardly directed spine behind and 4-5 shorter ones below. Bony ring around posterior part of eye serrated. Hind border of preopercle strongly serrated, its angle produced and rounded. Operculum with one spine. Fourth or fifth dorsal spine longest, about 1.2 eye diameter in length. Third anal spine slightly longer than longest dorsal spine. Soft dorsal and anal angularly rounded. Pectoral and ventral subequal, as long as half snout length shorter than head. Colour: Dorsal part of head and back dusky becoming whitish on sides and below. A yellowish mid-dorsal stripe from snout to origin of dorsal; a yellowish stripe from snout, above eye to below last dorsal spine and another similar stripe from rear of upper part of eye, along lateral line to below last dorsal spine; a wide yellow curved band edged black from below eye to behind last dorsal spine. A yellow blotch on body below last dorsal rays. Dorsal pale yellowish, anterior half of dorsal becoming blackish distally. Anal black anteriorly and white posteriorly. Pectoral, ventral and caudal yellowish.

Local name: *Kolkodindan* (Bitra).

Distribution: Laccadives, Andamans, Indonesia to the Philippines, Japan and Fiji.

Family GATERINIDAE

Body deeply ovoid, moderately compressed. Mouth small; maxilla slips below preorbital for most of its length. Teeth conical in some rows anteriorly and in a single row posteriorly, the outer row enlarged. Preoperculum strongly serrate. A blunt spine on operculum. A single dorsal fin. Ventrals with an axillary process. Seven branchiostegals, pseudobranchiae small. Gill membranes free from isthmus. Scales small ctenoid, vertical fins partly scaly. Lateral line gently curved in its anterior part.

1. No dark brown lateral bands. Dark brown with reddish tinge; caudal, distal part of dorsal and anal lighter *Gaterin nigrus*
Dark brown lateral bands on sides 2
2. D. XIII, 17-18. Ll. 80-84. Sides with several dark brown bands as wide as or wider than interspaces; bands continuous round front of head. Vertical fins with blackish blotches *Gaterin orientalis*
D. XIII, 19. Ll. 63. 3 dark brown bands broader than light interspaces. Caudal with one or two oblique dark bands *Gaterin albovittatus*

275. *Gaterin nigrus* (Cuvier)

Pristipoma nigrum Cuvier and Valenciennes, Hist. Nat. Poissons, 5, p. 258, 1830.

Diagramma crassispinum Day, Fishes of India, p. 78, pl. 20, fig. 4, 1878.

Gaterin nigrus Smith, Ichth. Bull., 25, p. 490, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 109/224).

Plectorhynchus crassispina Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 410, 1936.

Pseudopristipoma nigra Munro, Fishes of Ceylon, p. 150, pl. 29, fig. 437, 1955.

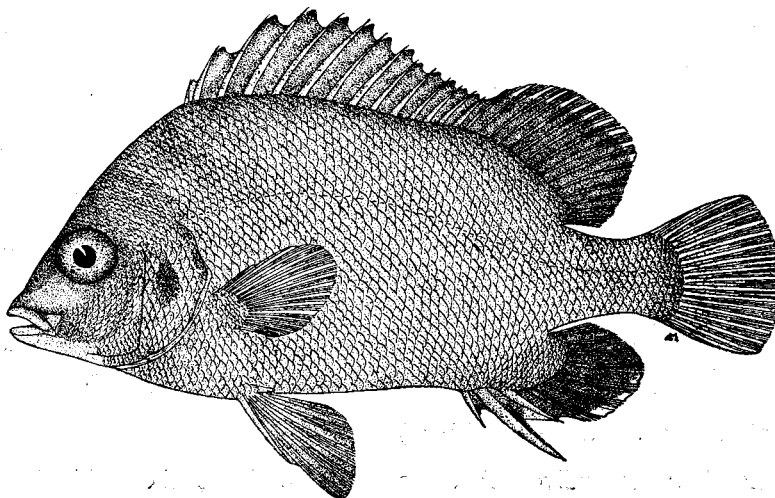


FIG. 275. *Gaterin nigrus* (Cuvier), 87 mm.

Specimens studied: Chetlat (4), 63 to 87 mm. Kiltan (2), 76 and 84 mm. Minicoy (28), 36 to 102 mm.

D. XIII-XIV, 16-18; A. III, 7-8; P. ii, 14-15; V. I, 5. Ll. 53-56; Ltr. 11-12+1+18-20. GR. 7+1+18-19.

Head 2.8-3.0 in standard length, 3.5-3.7 in total length. Depth of body 1.9-2.1 in standard length, 2.3-2.5 in total length. Eye 3.3-3.5 in head, 0.9-1.2 in snout and slightly more than interorbital space. Maxillary reaching to below front border of eye. Hind border of preoperculum serrated. Pectoral shorter than head without snout, ventral longer than pectoral. Colour: Dark brown with reddish tinge. Dorsal, anal and ventral brownish; caudal, distal part of dorsal and anal whitish.

Local names: *Naharidathimas* (Minicoy). *Karutha-kotha* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India and Ceylon, Indonesia, China, Philippines, Australia and Samoa.

276. *Gaterin orientalis* (Bloch)

Anthias orientalis Bloch, Naturges, Ausland. Fische, 7, p. 10, pl. 326, fig. 3, 1793.

Diagramma orientale Day, Fishes of India, p. 80, pl. 20, fig. 6, 1878.

Gaterin orientalis Munro, Fishes of Ceylon, p. 151, pl. 29, fig. 440, 1955. Smith, Ichth. Bull., 25, p. 486, pl. 69, B, C and fig. 15, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 109/225).

Plectorhynchus orientalis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 425, fig. 83, 1936.

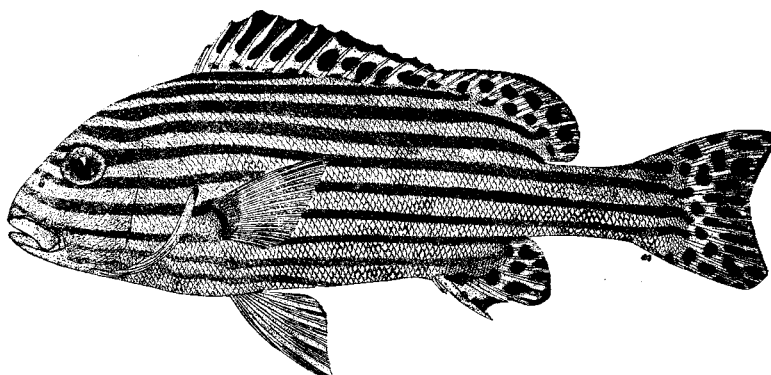


FIG. 276 a. *Gaterin orientalis* (Bloch), 280 mm.

Specimens studied: Agathi (1), 280 mm. Minicoy (4), 38 to 110 mm.

D. XIII, 17-18; A. III, 7; P. ii, 15-16; V. I, 5. Ll. 80-84; Ltr. 17+1+27-29. GR. 10+1+20-24.

Head 3.0-3.5 in standard length, 3.7-4.5 in total length. Depth of body 2.7-3.1 in standard length, 3.4-4.1 in total length. Eye 3-4 in head, 1.1-1.2 in snout and equal to or a little more than interorbital space. Maxilla reaching to below front border of eye. Hind border of preopercle serrated. Pectoral as long as head without snout, subequal to ventral. Colour: Yellowish with several dark brown bands as wide as or wider than interspaces. Bands appear as irregular patches in the young. Dorsal with dark edge and with large blotches below. Anal with blackish blotches. Caudal with several blackish blotches. Pectoral yellowish with a dark blotch at base.

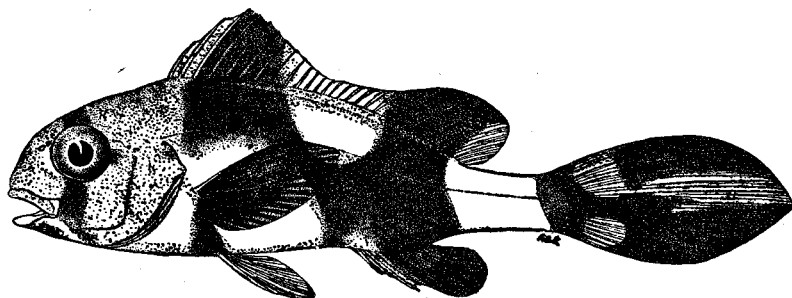


FIG. 276 b. *Gaterin orientalis* (Bloch), 38 mm.

Local name: *Haravalumas* (Minicoy). *Kotha* (Agathi).

Distribution: Tropical Indo-Pacific from the east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and to Samoa and Tahiti.

277. *Gaterin albovittatus* (Rüppell)

Diagramma albovittatum Rüppell, Neue Wirbelt, Fische Rothen Meeres, p. 125, pl. 31, fig. 2, 1835.

Diagramma lineatum var. *albovittatum* Day, Fishes of India, p. 79, pl. 20, fig. 5, 1878.

Gaterin albovittatus Smith, Ichth. Bull., 25, p. 488, pl. 69, A, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 109/226).

Plectorhynchus albovittatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 422, fig. 82, 1936.

Specimen studied: Minicoy (1), 112 mm.

D. XIII, 19; A. III, 7; P. ii, 15; V. I, 5. Ll. 63; Ltr. 13+1+24. Gr. 10+1+19.

Head 2.9 in standard length, 3.65 in total length. Depth of body 2.5 in standard length, 3.3 in total length. Eye 3.7 in head, equal to snout and also interorbital space. Maxillary reaching past front border of eye. Pectoral equal to head without snout. Vertical limb of preopercle finely serrated. Colour: Silvery white; a dark brown median band from the occiput to the base of the

anterior dorsal spines, a second band from the snout passing above the eye, increasing in width posteriorly and continued to the median rays of dorsal and a third band from snout through eye, broadest above the pectoral and continued to the caudal fin. Fins yellowish, spinous dorsal with narrow dark edge increasing in width posteriorly on the soft dorsal, caudal with two oblique dark bands on the upper lobe and one along the lower lobe; lower edge of anal dark; ventral with dark tip; pectoral hyaline.

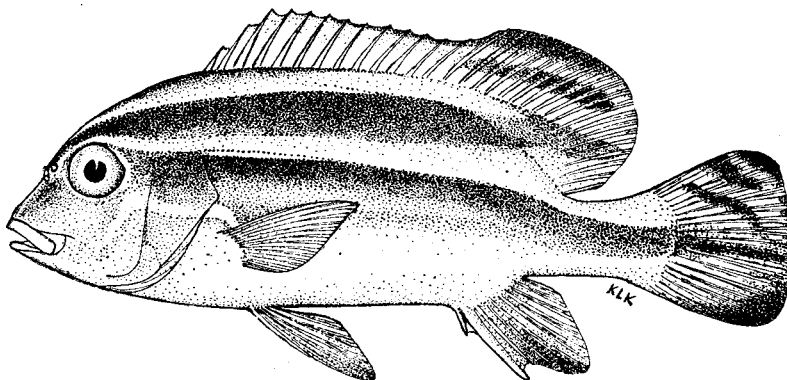


FIG. 277. *Gaterin albovittatus* (Rüppell), 112 mm.

Local name: *Haravalumas* (Minicoy).

Distribution: Red Sea and Ibo (East Africa) in the Western Indian Ocean and the Laccadives and coasts of India to Indonesia, Philippines and Marshall Islands.

Family SCIAENIDAE

Body oblong to elongate and somewhat compressed. Mouth large, protractile or not. Maxillary without supramaxillary; its upper border connected by the preorbital and suborbital and posteriorly expanded. Preopercle often crenulate or denticulate; operculum with two flat spines. Teeth in villiform bands in jaws, outer or sometimes inner row conical or sometimes caninoid. Gill membranes separate, free from isthmus. Scales ctenoid or sometimes cycloid. Lateral line complete, slightly arched anteriorly.

Mandibular symphysis with a median tubercle in a groove and two pores on either side. Blackish spots on back and irregular black spots on dorsal and caudal *Johnius diacanthus*

Free border of upper jaw lobate with 4 pores. Lower jaw with 5 mental pores.

Five broad interrupted cross bands on upper half of sides

..... *Johnius maculatus*

278. *Johnius diacanthus* (Lacépède)

Lutjanus diacanthus Lacépède, Hist. Nat. Poissons, 4, pp. 195 and 240, 1802.

Johnius diacanthus Fowler, J. Bombay nat. Hist. Soc., 30, p. 777, 1926. Munro, Fishes of Ceylon, p. 153, pl. 28, fig. 447, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 89/227).

Pseudosciaena diacanthus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 515, 1936.

Sciaena diacanthus Day, Fishes of India, p. 189, 1878.

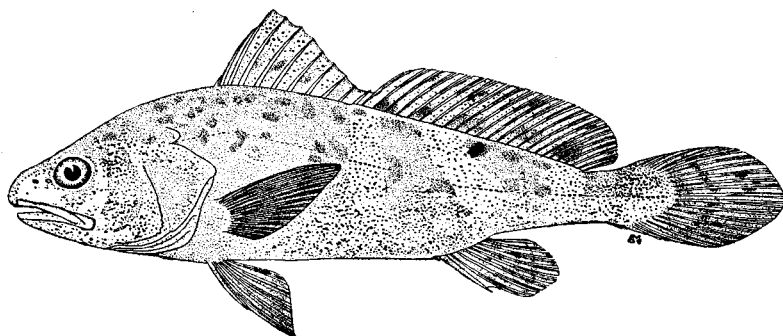


FIG. 278. *Johnius diacanthus* (Lacépède), 115 mm.

Specimen studied: Kavarathi (1), 115 mm.

D. X, I, 24; A. II, 7; P. 18; V. I, 5. Ll. 51; Ltr. 8+1+17.

Head 3 in standard length, 3.7 in total length. Depth of body 3.6 in standard length, 4.4 in total length. Eye 5.3 in head, 1.25 in snout and also in convex interorbital space. Free border of snout with lateral incision. Maxillary reaching below hind border of eye. Mandibular symphysis with a median tubercle in a groove and two pores on either side. Preopercle denticulate, opercle with two weak spines. Teeth in villiform bands in upper jaw with an outer row of conical teeth; lower jaw with a row of villiform teeth and an inner row of slightly larger teeth. Soft dorsal and anal with a low scaly sheath. Pectoral longer than postorbital length of head, ventral slightly shorter. Colour: Brownish with blackish spots on back, lighter below. Dorsal yellowish with black spots; pectoral, ventral and anal brownish; caudal fin with irregular black spots.

Distribution: Laccadives, coasts of India and Ceylon to Indonesia, Philippines and China.

279. *Johnius maculatus* Bloch and Schneider

Johnius maculatus Bloch and Schneider, Syst. Ichth., p. 75, 1801. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 538, 1936. Munro, Fishes of Ceylon, p. 154, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 89/228).

Sciaena maculata Day, Fishes of India, p. 190, 1878.

Specimen studied: Kalpeni (1), 113 mm.

D. X, I, 24; A. II, 7; P. 18; V. I, 5. Ll. 49; Ltr. 8+1+18.

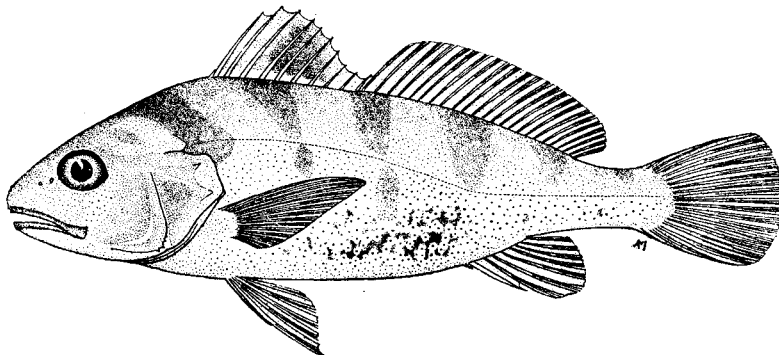


FIG. 279. *Johnius maculatus* Bloch and Schneider, 113 mm.

Head about 3 in standard length, 3.7 in total length. Depth of body 3.1 in standard length, 3.8 in total length. Eye 4.3 in head, 1.1 in snout and 0.9 in interorbital space. Maxillary reaching to below hind border of iris. Preopercle with widely separated denticulations. Opercle with two obtuse spines. Snout prominent before jaws, its free border lobate with 4 pores. Lower jaw with 5 mental pores. Teeth villiform in upper jaw with an outer row of conical teeth and villiform teeth in lower jaw. Pectoral shorter than head without snout. Colour: Silvery grey above, abdomen whitish. Five broad interrupted black cross bands; the first from nape and terminating below the lateral line, the second below fourth to seventh dorsal spines ending above the hind half of pectoral fin; the third below the two dorsal fins obliquely downwards; the fourth below the middle of soft dorsal and ending below the lateral line and the fifth below the last rays of dorsal. Upper two thirds of spinous dorsal blackish; other fins yellowish.

Distribution: Laccadives, coasts of India, Ceylon and Malaya.

Family LETHRINIDAE

Body oblong, moderately compressed, snout pointed. Mouth terminal, moderate, lips thick. Teeth in jaws conical, a few of the front teeth enlarged and caniniform; hind teeth sometimes molars. Palatines edentulous. Gill membranes united, but free from isthmus. Six branchiostegals. Dorsal fin single, of X strong spines and 9-10 branched rays. Anal with III spines and 8 branched rays. Scales of moderate size, ctenoid; head with the exception of operculum and nape naked. Lateral line complete.

1. Depth of body not less than head length. Hind teeth molar-like 2
- Depth of body less than head. Hind upper teeth more or less lanceolate . . 4

2. An oblong black blotch below lateral line opposite tip of pectoral
..... *Lethrinus harak*
No black blotch on side of body 3
3. Five scales above lateral line. Longest anal ray not longer than base of soft
anal. Nape prominent. Hind opercle edge brown .. *Lethrinus mahsena*
Six scales above lateral line. Depth of head through centre of eye less than
snout and eye together. Three or four indistinct yellowish bands on sides
..... *Lethrinus obsoletus*
4. Six scales above lateral line. A brown spot below lateral line above middle
of pectoral; indistinct brown bars on sides and three stripes on snout
..... *Lethrinella miniatus*
Five scales above lateral line 5
5. Hind nostril midway between tip of snout and hind margin of head. Inter-
orbital space flat. A dark spot just below origin of lateral line; a reddish
spot at upper edge of pectoral base *Lethrinella xanthocheilus*
Hind nostril nearer to tip of snout than to hind margin of head. Interorbital
space convex. Three narrow streaks from eye towards upper jaw; a dark
blotch on upper edge of opercle; indistinct dark blotch between lateral
line and middle of pectoral and irregular dark bars on back and spots
on sides *Lethrinella microdon*

280. *Lethrinus harak* (Forskål)

Sciaena harak Forskål, Descript. Animal. p. 52, 1775.

Lethrinus harak Smith, Ichth. Bull., 17, p. 288, pl. 20, C, 1959. Silas and Toor, J. Mar. biol. Ass. India, 3, p. 211, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 102/229).

Lethrinus rhodopterus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 450, 1936. Balan, J. Bombay nat. Hist. Soc., 55, p. 301, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 46, 1959.

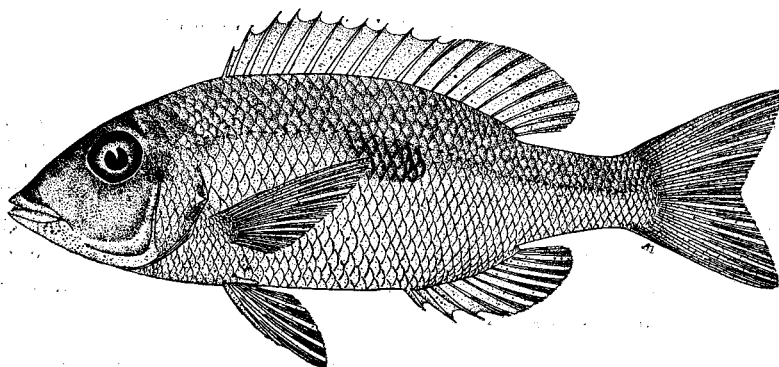


FIG. 280. *Lethrinus harak* (Forskål), 110 mm.

Specimens studied: Agathi (2), 90 and 95 mm. Ameni (2), 86 and 98 mm. Minicoy (115), 78 to 160 mm.

D. X, 9; A. III, 8; P. ii, 11; V. I, 5. Ll. 46-47. Ltr. $5\frac{1}{2}+1+15$. GR. 4-5+5.

Head 2.8-3.1 in standard length, 3.6-3.9 in total length. Depth of body 2.7-2.8 in standard length, 3.4-3.5 in total length. Eye 3.4-3.6 in head, 1.5-1.8 in snout and about equal to slightly convex interorbital space. Maxillary reaching to below nostrils. Canines small, posterior teeth rounded molars. Pectoral slightly shorter than head, ventral equal to snout and $\frac{2}{3}$ eye diameter. Fourth dorsal spine longest, 1.3-1.4 of eye diameter. Third anal spine slightly longer than eye diameter. Colour: Brownish above, lighter below; upper part of operculum slightly dark. An oblong black blotch below lateral line opposite to tip of pectoral. Fins pale yellowish, ventral often slightly dusky.

Local names: *Filolu*, *Makarimas* (Minicoy). *Metti*, *Chuttommetti* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, Indonesia, Philippines and Ryukyu, Samoa and Tonga Islands and Queensland.

281. *Lethrinus mahsena* (Forskål)

Sciaena mahsena Forskål, Descript. Animal., p. 52, 1775.

Lethrinus mahsena Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 444, 1936. Smith, Ichth. Bull., 17, p. 289, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 102/230).

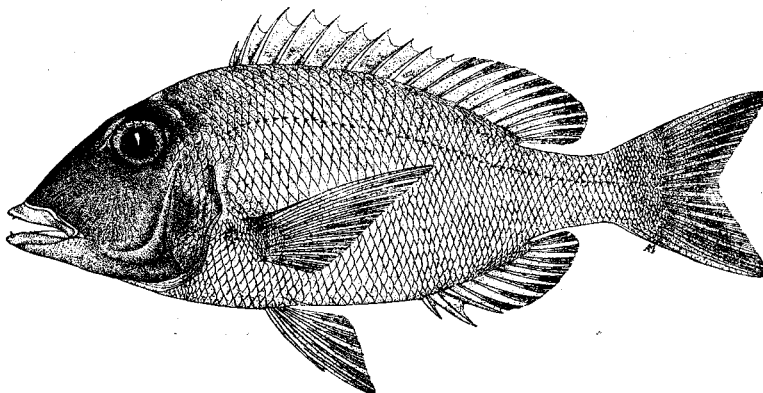


FIG. 281. *Lethrinus mahsena* (Forskål), 190 mm.

Specimens studied: Agathi (3), 154 to 190 mm. Ameni (1), 89 mm. Bitra (1), 100 mm. Kalpeni (1), 66 mm. Minicoy (2), 120 and 265 mm.

D. X, 9; A. III, 8; P. ii, 11; V. I, 5. Ll. 47-48; Ltr. $4\frac{1}{2}+1+15$. GR. 5+5-6.

Head 2.5-2.8 in standard length, 3.2-3.5 in total length. Depth of body 2.5-2.9 in standard length, 3.2-3.6 in total length. Eye 3.5-3.7 in head, 1.8-2.2 in snout and about 1.0-1.2 in slightly convex interorbital space. Maxillary reaching to below anterior nostril. Teeth in jaws pointed anteriorly, posterior ones molars. Pectoral as long as head; ventral shorter than pectoral by about an eye diameter. Third and fourth dorsal spines subequal. Third anal spine slightly longer than the second. Base of soft anal longer than longest anal ray. Colour: Head dull chocolate brown, hind opercle edge deep brown, body pale brownish, much lighter below. Dorsal, anal and ventral pale; pectoral lighter with the base slightly brownish, caudal pale brownish with lighter hind border.

Local names: *Filolu* (Minicoy). *Metti* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, Indonesia, Philippines and beyond to Tuamotu Islands.

282. *Lethrinus obsoletus* (Forskål)

Sciaena ramak obsoleta Forskål, Descript. Animal., p. 52, 1775.

Lethrinus ramak Day, Fishes of India, p. 137, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 455, 1936.

Lethrinus obsoletus Smith, Ichth. Bull., 17, p. 289, pl. 20, G, 1959. Smith and Smith, Fishes of Seychelles, p. 31, pl. 65, G, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 102/231).

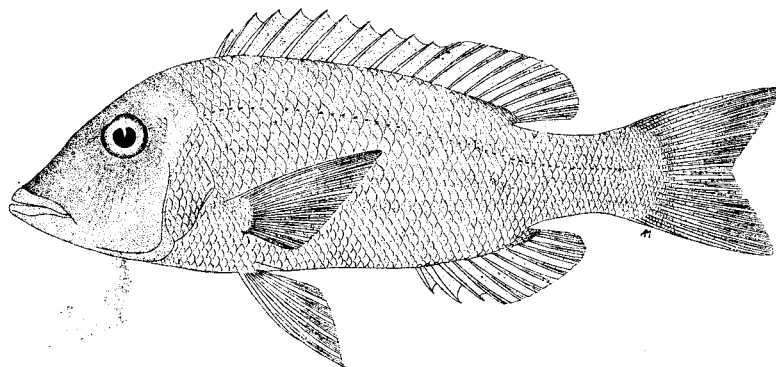


FIG. 282. *Lethrinus obsoletus* (Forskål), 210 mm.

Specimens studied: Ameni (1), 140 mm. Kavarathi (1), 210 mm.

D. X, 9; A. III, 8; P. ii, 11; V. I, 5. Ll. 48-49; Ltr. $5\frac{1}{2}+1+16$.

Head 2.9-3.0 in standard length, 3.6-3.7 in total length. Depth of body 2.8-2.9 in standard length, 3.5-3.6 in total length. Eye 3.8-4.1 in head, 1.6-2.1 in snout and 1.0-1.2 in slightly convex interorbital space. Dorsal profile of head moderately elevated. Depth of head less than its length. Maxillary reaching to

below anterior nostril. Canines small, lateral teeth conical, posterior ones moderate molars. Third or fourth dorsal spine longest, 1.3 eye diameter, slightly shorter than longest dorsal ray. Third anal spine longer than the second, slightly more than eye diameter and shorter than longest anal ray. Pectoral one eye diameter shorter than head. Ventral as long as snout and eye together. Colour: Slightly brownish above, pale yellowish below with 3-4 indistinct yellowish horizontal lines on sides. Head chocolate brown. Dorsal and anal pale with dark markings. Pectoral and ventral pale yellowish.

Local name: *Metti* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Palau Islands and eastwards to Samoa.

283. *Lethrinella miniatus* (Forster-Schneider)

Sparus miniatus (Forster) Bloch and Schneider, Syst. Ichth., p. 281, 1801.

Lethrinus miniatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 445, fig. 89, 1936.

Lethrinella miniatus Smith, Ichth. Bull., 17, p. 292, pl. 22, A and F, 1959. Smith and Smith, Fishes of Seychelles, p. 31, pl. 67, A and F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 102/232).

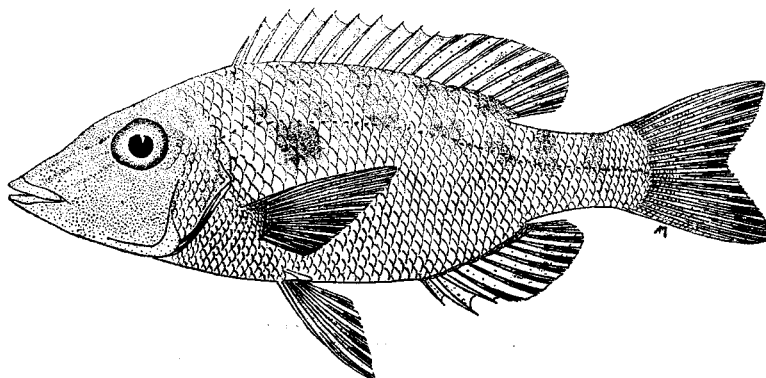


FIG. 283. *Lethrinella miniatus* (Forster-Schneider), 160 mm.

Specimens studied: Kavarathi (6), 70 to 88 mm. Minicoy (57), 65 to 160 mm.

D. X, 9; A. III, 8; P. ii, 11; V. I, 5. Ll. 48-49; Ltr. $5\frac{1}{2}+1+16-17$.

Head 2.7-2.8 in standard length, 3.3-3.5 in total length. Depth of body 2.8-3.0 in standard length, 3.4-3.7 in total length. Eye 3.4-3.8 in head, 1.5-1.9 in snout and 0.9-1.1 in somewhat flat interorbital space. Maxillary reaching almost to below anterior nostril. Hind nostril nearer to tip of snout than to hind edge of operculum. Lateral teeth in jaws conical, front canines moderate. Third

or fourth dorsal spine longest, 1.3-1.5 eye diameter. Third anal spine somewhat longer than second spine, shorter than longest dorsal spines. Pectoral equal to or slightly longer than snout and eye together. Ventral half eye diameter shorter than pectoral. Colour: Brownish above, lighter to yellowish below; a brown spot below lateral line above middle of pectoral and with indistinct brown vertical bars. Three narrow brown stripes from eye to maxillary. Dorsal grey with brownish markings. Anal and ventral grey. Pectoral yellowish.

Local names: *Thundigufilolu* (Minicoy). *Pulmetti* (Kavarathi).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan and eastwards to Tuamotu Islands.

284. *Lethrinella xanthocheilus* (Klunzinger)

Lethrinus xanthocheilus Klunzinger, Synopsis Fische Rothen Meeres, p. 753, 1870.

Lethrinella xanthocheilus Smith, Ichth. Bull., 17, p. 292, pl. 22, B, 1959. Silas and Toor, J. Mar. biol. Ass. India, 3, p. 210, text fig. 1 and plate fig. 1, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 102/233).

Lethrinella prox. *xanthocheilus* Silas and Toor, J. Mar. biol. Ass. India, 3, p. 210, plate figs. 2 and 3, 1961.

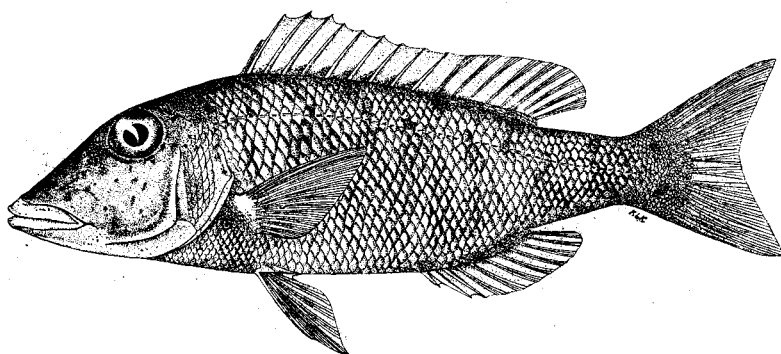


FIG. 284. *Lethrinella xanthocheilus* (Klunzinger), 196 mm.

Specimens studied: Agathi (16), 78 to 363 mm. Ameni (13), 172 to 188 mm. Bitra (1), 64 mm. Chetlat (3), 39 to 48 mm. Kadamat (2), 139 and 156 mm. Kavarathi (13), 60 to 114 mm. Minicoy (23), 67 to 196 mm.

D. X, 9; A. III, 8; P. ii, 11; V. I, 5. Ll. 47-48; Ltr. $4\frac{1}{2}+1+15$. GR. 5+5-6.

Head 2.7-3.0 in standard length, 3.4-3.8 in total length. Depth of body 3.10-3.25 in standard length, 3.8-4.0 in total length. Eye 3.6-4.4 in head, 1.7-2.4 in snout and 0.90-1.25 in flat interorbital space. A swelling anterodorsal to eye; upper border of eye nearly in line with dorsal profile of head. Maxilla scarcely reaching vertical through anterior nostril. Hind nostril midway between

tip of snout and hind border of head in large adults; nearer to tip of snout in juveniles. Pectoral slightly shorter than snout and eye, ventral shorter than pectoral by about $\frac{1}{2}$ eye diameter. Third dorsal spine longer than others, about 1.4 diameter of eye. Second anal spine shorter, but stronger than third, it being nearly one eye diameter. Colour: Head brown, upper sides of body brownish, lower sides lighter. A dark spot below origin of lateral line, indistinct in large adults and a few indistinct scattered spots on upper sides of body. A reddish spot at upper edge of base of pectoral. In some juvenile specimens a few indistinct dark spots on lower sides of head. Dorsal and anal pale, clouded dusky. Pectoral and ventral pale hyaline.

Local names: *Rythung-filolu* (Minicoy). *Kilukkam-metti* (other islands).

Distribution: Red Sea, east coast of South Africa and neighbouring islands in the Western Indian Ocean to the Laccadives and Andamans.

Note: Having examined a number of juvenile specimens, we are of the opinion that the specimens described by Silas and Toor as *Lethrinella prox. xanthocheilus* are juveniles of *xanthocheilus*. The reddish spot at pectoral base usually observed in large fresh specimens are often absent or in exceptional cases faintly observed just above pectoral base in juveniles.

285. *Lethrinella microdon* (Valenciennes)

Lethrinus microdon Cuvier and Valenciennes, Hist. Nat. Poissons, 6, p. 295, 1830. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 436, fig. 87, 1936. Munro, Fishes of Ceylon, p. 159, 1955.

Lethrinella microdon Smith, Ichth. Bull., 17, p. 293, pl. 25, 1959. Silas and Toor, J. Mar. biol. Ass. India, 3, p. 209, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 102/234).

Lethrinus rostratus Day, Fishes of India, p. 134, pl. 33, fig. 1, 1878 (not of Cuvier and Valenciennes).

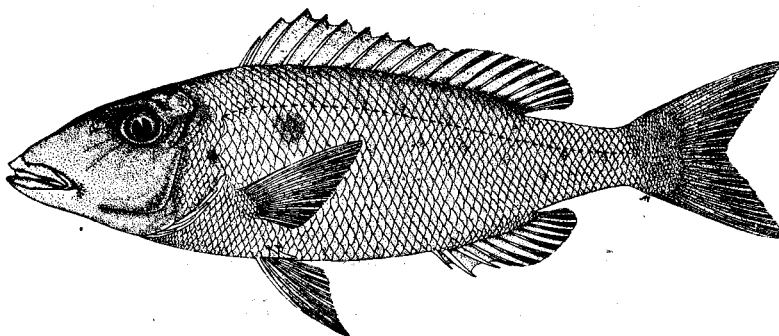


FIG. 285. *Lethrinella microdon* (Valenciennes), 243 mm.

Specimens studied: Agathi (1), 243 mm. Minicoy (65), 55 to 150 mm.

D. X, 9; A. III, 8; P. ii, 11; V. I, 5. Ll. 48; Ltr. $4\frac{1}{2}+1+15$. GR. $5+5$.

Head 2.7-2.9 in standard length, 3.5-3.7 in total length. Depth of body 3.0-3.2 in standard length, 3.8-4.0 in total length. Eye 4.6-5.0 in head, 2.3-2.5 in snout and 1.2-1.3 in evenly convex interorbital space. Area over nasal openings slightly enlarged. Hind nostril somewhat nearer to tip of snout than to hind margin of head. Maxillary reaching almost to vertical through anterior nostril. Teeth moderate, lateral teeth in jaws conical. Pectoral equalling length of snout and $2/3$ eye diameter; ventral shorter than pectoral. Third dorsal spine longest. Third anal spine slender and longer than the second. Colour: Light brownish to lighter, upper part of head darker; lower part of head slightly pinkish, three narrow dark streaks from eye to upper jaw, a dark blotch on upper edge of opercle, dark blotches in interorbital space and dorsolateral to eye, indistinct dark blotch between lateral line and middle of pectoral and traces of indistinct vertical bands on upper sides and a few irregular dark spots on sides of body. Fins pale, clouded with dark; membranes between first three ventral rays slightly dark.

Local names: *Filolu* (Minicoy). *Metti* (Agathi).

Distribution: Red Sea and Zanzibar to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Marianas and Marshall Islands.

Family PENTAPODIDAE

Body oblong, compressed. Teeth small in jaws with an outer series of distinct canines; those posteriorly in jaws sometimes rounded molars. Palate edentulous. Hind border of preoperculum denticulate. Six branchiostegals. Pseudobranchiae present. Gill rakers knob-like. A single dorsal fin consisting of X spines and 10-11 branched rays. Anal with III spines and 7-10 branched rays. Scales ctenoid. Lateral line complete.

- | | |
|--|----------------------------------|
| 1. Sides of jaws with rounded molars | <i>Monotaxis grandoculis</i> |
| Sides of jaws with conical teeth | 2 |
| 2. Canines in lower jaw flare outwards | <i>Gnathodentex aurolineatus</i> |
| Canines in lower jaw normal | <i>Gymnocranius griseus</i> |

286. *Monotaxis grandoculis* (Forskål)

Sciaena grandoculis Forskål, Descript. Animal., p. 53, 1775.

Monotaxis grandoculis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 350, fig. 73, 1936. Smith, Fishes of Southern Africa, p. 250, pl. 36, fig. 650, 1949. Munro, Fishes of Ceylon, p. 160, pl. 28, fig. 470, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 15, 1969 (Cat. No. CMFRI-LA-F. 192/215).

Sphaerodon heterodon Day, Fishes of India, p. 138, 1878.

Specimens studied: Bitra (1), 145 mm. Kavarathi (1), 360 mm. Kiltan (2), 130 and 160 mm. Minicoy (4), 120 to 200 mm.

D. X, 10; A. III, 9; P. ii, 12; V. I, 5. Ll. 47-48; Ltr. 5+1+14-15.

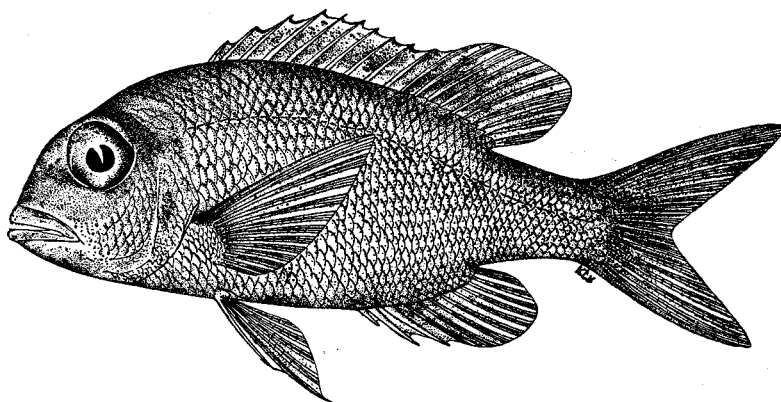


FIG. 286. *Monotaxis grandoculis* (Forsk.), 160 mm.

Head 3.0-3.1 in standard length, 3.8-4.1 in total length. Depth of body 2.4-2.6 in standard length, 3.2-3.4 in total length. Eye 2.5-3.7 in head, 0.7-1.4 in snout and 0.9-1.5 in almost flat interorbital space. Profile of snout deep. Maxillary reaching to below front border of eye or beyond. Anteriorly 6 canines in upper jaw and 4 canines in lower jaw; each side of both jaws with a single row of 6 rounded molars. Vomer and palatines edentulous. Pectoral equal to or half length of snout shorter than head. Ventral about half length of snout shorter than head. Dorsal spines slender, fourth or fifth longest, 1.2-1.4 eye diameter. Third anal spine 1.0-1.3 eye diameter. Interorbital space and preopercle flange naked. Colour: Light reddish brown on back becoming greyish on sides and lighter below. Dorsal brownish, more so between first five rays, hind rays lighter. Anal light brownish, base and hind rays lighter. Axil of pectoral blackish. Caudal brownish. Pectoral and ventral pale.

Local names: *Dathi* (Minicoy). *Pallan* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, south to Australia and eastwards to Friendly, Samoan, Society and Hawaiian Islands.

287. *Gnathodentex aurolineatus* (Lacépède)

Sparus aurolineatus Lacépède, Hist. Nat. Poissons, 4, pp. 42 and 132, 1803.

Gnathodentex aurolineatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 348, fig. 72, 1936. Smith, Fishes of Southern Africa, p. 250, pl. 36, fig. 648, 1949. Munro, Fishes of Ceylon, p. 160, pl. 28, fig. 472, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 14, 1969 (Cat. No. CMFRI-LA-F. 192/214).

Pentapus aurolineatus Day, Fishes of India, p. 93, 1878.

Specimens studied: Agathi (1), 143 mm. Bitra (2), 145 and 165 mm. Minicoy (2), 156 and 158 mm.

D. X, 10; A. III, 9; P. ii, 13; V. I, 5. Ll. 76-77; Ltr. 6+1+19. GR. 4+1+6.

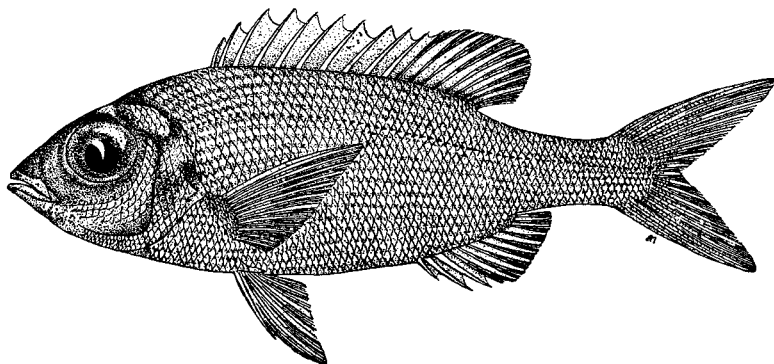


FIG. 287. *Gnathodentex aurolineatus* (Lacépède), 156 mm.

Head 3.1-3.3 in standard length, 3.9-4.1 in total length. Depth of body 2.8-3.1 in standard length, 3.5-3.9 in total length. Eye 2.6-2.8 in head, 0.8 in snout and 0.8-0.9 in interorbital space. Outer edge of maxillary denticulate. Maxillary not reaching below anterior border of eye. Teeth villiform, outer row slightly enlarged, both jaws with 4 canines anteriorly. Vomer and palatines edentulous. Preopercle edge rough without notch. Fourth dorsal spine longest, more than eye. Third anal spine longer than second, pectoral about 2/5 snout shorter than head. Ventral equal to or longer than head without snout. Interorbital space and preopercle flange naked. Colour: Brownish, lighter below with narrow whitish stripes on sides. Spinous dorsal somewhat dusky; other fins slightly lighter.

Local names: *Bondu* (Minicoy). *Cheekkanni* (other islands).

Distribution: East coast of South Africa and neighbouring islands in the Western Indian Ocean to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and beyond to Tuamotu Islands.

288. *Gymnocranius griseus* (Schlegel)

Dentex griseus Schlegel, Fauna Japonica, Pisces, p. 72, pl. 36, 1842.

Gymnocranius griseus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 391, fig. 76, 1936. Munro, Fishes of Ceylon, p. 160, pl. 28, fig. 471, 1955. Smith, Fishes of Southern Africa, p. 250, fig. 649, 1961. Smith and Smith, Fishes of Seychelles, p. 27, pl. 22, C, 1963.

Specimen studied: Kavarathi (1), 137 mm.

D. X, 10; A. III, 10; P. ii, 12; V. I, 5. Ll. 50; Ltr. 5+1+16.

Head 2.9 in standard length, 3.7 in total length. Depth of body 2.6 in standard length, 3.3 in total length. Eye 3 in head, equal to snout and 0.9 in slightly convex interorbital space. Interorbital space, preopercular flange and base of dorsal and anal without scales. Four or five rows of scales on preoperculum. Jaws with slender curved teeth anteriorly, outer row caninoid; lateral teeth conical and stout. Third and fourth dorsal spine longest, equal to eye diameter. Third anal spine longest, equal to $3/4$ eye diameter. Pectoral half length of snout shorter than head. Ventral equal to one and a half eye diameter. Colour: Olive with a dark band across eyes and four cross bands becoming indistinct below on side of body. Fins pale yellowish.

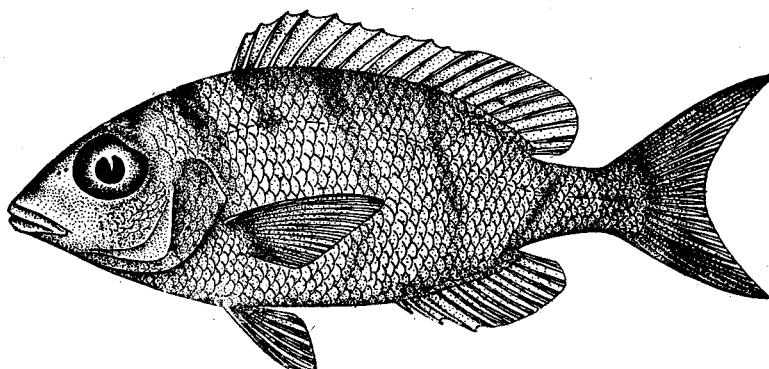


FIG. 288. *Gymnocranius griseus* (Schlegel), 137 mm.

Distribution: East coast of Africa to Seychelles, Mauritius, Reunion, Laccadives, Ceylon, Indonesia, Philippines, China, Japan and Australia.

Family MULLIDAE

Body moderately elongate, more or less compressed. Snout obtuse. Mouth small, subterminal, teeth small, acute, pluriseriata or uniseriata in jaws, teeth present or absent on palatines and vomer. Two dorsal fins, the first with VII-VIII spines, the second with I weak spine and 7-9 rays. Anal usually with I spine and 6-8 rays. Basal half of dorsal and anal sometimes covered with scales. Two long simple barbels on chin. Preoperculum usually entire. Gill membranes free from isthmus. Three or four branchiostegals. Four gills. Pseudobranchiae present. Scales large; lateral line complete.

- | | |
|---|---|
| 1. Vomer and palatines with teeth | 2 |
| Palatines edentulous | 5 |
| 2. Brownish with reddish patches; a dark lateral stripe; head and body spotted with blackish; 4-5 oblique blackish bars on each caudal lobe | |
| <i>Upeneus tragula</i> | |
| Colour not as above | 3 |

3. Usually 3 pale yellow lateral bands. Spinous dorsal black distally and with 2 dark bands; upper lobe of caudal with 4-5 oblique dark bars; lower lobe with 3-4 oblique dark bars *Upeneus vittatus*
 A brown or pale lateral band 4
4. 33-35 lateral line scales. Sides dull yellowish with a brown lateral stripe. Depth of body less than 4 in length. Upper lobe of caudal with 5-6 oblique brownish stripes; posterior margin of lower lobe brownish or with 5-6 brownish stripes *Upeneus sundaicus*
 38-39 lateral line scales. Sides milky white with a pale lateral stripe. Depth of body more than 4 in length. Upper lobe of caudal with 6 oblique black bars, lower lobe with 5 black bars of which the outer two much broader than others *Upeneus arge*
9. Teeth small, in narrow villiform bands. Maxillary not reaching front border of eye. 36-40 lateral line scales 6
 A single series of acute teeth in jaws. Maxillary far distant from eye. 28-31 lateral line scales 7
6. A dark blotch below lateral line on 7th-9th or 8th-10th scales from operculum *Mulloidichthys samoensis*
 A yellow band from eye to base of caudal. No black blotch on body *Mulloidichthys auriflamma*
7. Dorsal spines flexible and not pungent 8
 Dorsal spines rigid and pungent or slightly flexible at tip only 12
8. A black lateral blotch on caudal peduncle 9
 No black blotch on caudal peduncle 10
9. A black lateral stripe from snout through eye to upper portion of caudal peduncle. A black spot on lateral line at base of caudal *Parupeneus barberinus*
 No black lateral stripe. A black spot on lateral line on the posterior half of caudal peduncle. A yellow patch on lateral line below and behind spinous dorsal *Parupeneus indicus*
10. A black blotch on lateral line below interspace between 7th dorsal spine and origin of soft dorsal followed by an oblong yellow blotch *Parupeneus pleurostigma*
 No black blotch or yellow blotch as above 11
11. Yellowish brown, lighter below with a yellowish saddle dorsally on caudal peduncle; bluish lines radiating from eye *Parupeneus chryserydros*
 Yellowish to rosy. Pale longitudinal lines along upper side of head. No yellowish saddle on caudal peduncle *Parupeneus luteus*

12. A black horizontal band from snout through eye ending below posterior rays of soft dorsal or slightly behind; a large black spot on caudal peduncle *Parupeneus macronemus*
 No black horizontal band or black spot on caudal peduncle 13
13. Width of end of maxilla equal to eye diameter. Last dorsal and anal ray longer than base of fins. Five broad black transverse bands on sides *Parupeneus trifasciatus*
 Width of end of maxilla less than eye diameter. Last dorsal and anal ray not longer than base of fins. Three broad black transverse bands on sides *Parupeneus bifasciatus*

289. *Upeneus tragula* Richardson

Upeneus tragula Richardson, Ichth. China and Japan, p. 220, 1845. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 368, fig. 75, 1931. Smith, Fishes of Southern Africa, p. 228, pl. 27, fig. 560, 1949. Munro, Fishes of Ceylon, p. 162, pl. 32, fig. 477, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/235).

Upeneoides tragula Day, Fishes of India, p. 121, pl. 30, fig. 4, 1878.

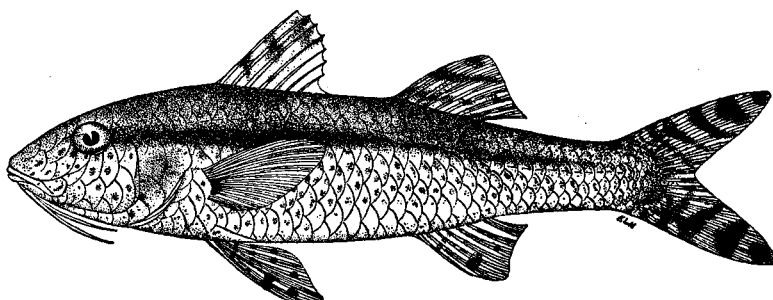


FIG. 289. *Upeneus tragula* Richardson, 106 mm.

Specimens studied: Agathi (2), 71 and 106 mm. Kadamat (3), 69 to 79 mm. Minicoy (4), 60 to 85 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 13-14; V. I, 5. Ll. 29-31; Ltr. 2½ + 1 + 6½. GR. 5-6 + 1 + 15-16.

Head 3.1-3.4 in standard length, 3.9-4.3 in total length. Depth of body 3.5-4.0 in standard length, 4.5-5.0 in total length. Eye 3.7-4.7 in head, 1.4-1.8 in snout and 1.1-1.3 in nearly flat interorbital space. Maxillary reaching to below front border of eye. Preorbital scaled. Teeth in villiform bands in jaws, vomer and palatines with teeth. Barbels reaching vertical through hind margin of preoperculum. First dorsal spine minute, second dorsal spine longest, equal to snout and eye together. Pectoral slightly shorter than ventral. Colour: Head and body brownish with reddish patches above, lighter below, a blackish brown longitudinal

stripe from snout through eye to base of caudal; scales on head and sides of body with dark brown spots and an inconspicuous dark brown saddle posterior to base of soft dorsal fin. First and second dorsal somewhat transparent with elongate blackish marks. Ventral and anal with blackish spots. A black spot near base of pectoral. Caudal lobes with 5 oblique blackish bars.

Local names: *Galithelakanthi* (Minicoy). *Manakkam* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Palau Islands, north to Japan, south to Australia.

290. *Upeneus vittatus* (Forsk.)

Mullus vittatus Forsk., Descript. Animal., p. 31, 1775.

Upeneoides caeruleus Day, Fishes of India, p. 121, 1878.

Upeneoides vittatus Day, Fishes of India, p. 120, pl. 30, fig. 2, 1878.

Upeneus vittatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 365, 1931. Smith, Fishes of Southern Africa, p. 228, pl. 27, fig. 561, 1949.

Munro, Fishes of Ceylon, p. 163, pl. 32, fig. 480, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat., No. CMFRI-LA-F. 83/236).

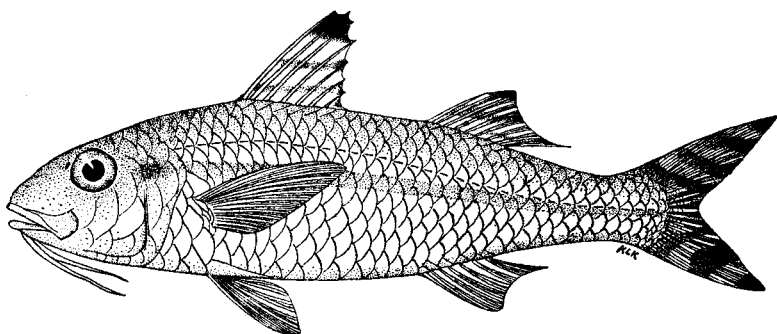


FIG. 290. *Upeneus vittatus* (Forsk.), 104 mm.

Specimens studied: Agathi (3), 101 to 104 mm. Kavarathi (4), 71 to 111 mm.

D₁. VIII; D₂, i, 8; A. I, i, 6; P. 15-17; V. I, 5. Ll. 34-36; Ltr. 2½ + 1 + 6½. GR. 7-8 + 1 + 18-19.

Head 3.2-3.5 in standard length, 4.0-4.3 in total length. Depth of body 3.3-3.7 in standard length, 4.2-4.6 in total length. Eye 4.0-4.2 in head, 1.3-1.5 in snout and 1.2-1.3 in nearly flat interorbital space. Maxilla reaching to below front of pupil. Barbels nearly reaching to below hind border of preoperculum. Teeth in villiform bands in jaws, vomer and palatines toothed. No scales on preorbital. First dorsal spine minute, second equal to or slightly shorter than third, it being one eye diameter shorter than head. Pectoral ¾ eye diameter

shorter than head, ventral shorter than head without snout. Colour: Greyish to light tan on back, sides and below yellowish with 3-4 pale yellow bands on sides fading quickly after death. Spinous dorsal intensely black distally and with two dark bands; soft dorsal with 3 dark bars; upper lobe of caudal with 4-5 oblique dark bars, lower lobe with 3-4 oblique dark bars; ventral, anal and pectoral transparent.

Local name: *Manakkam* (other islands).

Distribution: Widespread from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, Japan, Australia and Fiji, Samoa and Marquesas Islands.

291. *Upeneus sundaicus* (Bleeker)

Upeneoides sundaicus Bleeker, Nat. Tijds. Ned.-Ind., 8, p. 411, 1855.

Upeneus sundaicus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 370, 1931. Jones and Kumaran, J. Mar. b'ol. Ass. India, 7, p. 114, fig. 8, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/237).

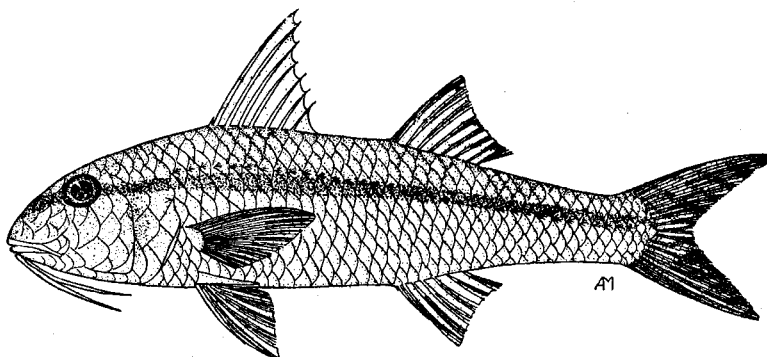


FIG. 291. *Upeneus sundaicus* (Bleeker), 108 mm. (after Jones and Kumaran)

Specimens studied: Agathi (1), 74 mm. Kadamat (4), 94 to 112 mm. Kavarathi (2), 84 and 122 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 14-15; V. I, 5. Ll. 33-35; Ltr. 2½ + 1 + 6½. GR. 5-6 + 1 + 14-15.

Head 3.3-3.6 in standard length, 4.1-4.5 in total length. Depth of body 3.6-3.9 in standard length, 4.6-5.0 in total length. Eye 4.0-4.6 in head, 1.5-2.0 in snout and 1.1-1.3 in slightly convex interorbital space. Maxillary extending beyond a level from the anterior border of eye. Teeth in villiform bands in jaws, vomer and palatines with teeth. Preorbital scaled. Barbel extending to hind border of preoperculum. First dorsal spine minute, second longest, about 2/5

length of snout shorter than head. Pectoral longer than head without snout; ventral slightly shorter than pectoral. Colour: Dull yellowish, lighter below, upper sides slightly brownish with a brown longitudinal band from snout through eye to base of caudal. Spinous dorsal pale, soft dorsal with three obscure stripes, upper lobe of caudal with 5 or 6 oblique pale to slightly brownish stripes, posterior half of lower lobe brownish or with 5 or 6 irregular stripes. Other fins yellowish hyaline.

Local name: *Manakkam* (other islands).

Distribution: Recorded only from the Laccadives, Singapore, Indonesia and Philippines.

Note: Lachner, 1954 (Proc. U.S. Nat. Mus., **103**, 507) considers this as a questionable species. This species is clearly distinct from *U. luzonius* to which it is closely related. The body colour is much lighter, the upper lobe of caudal has pale or slightly brownish stripes, lower lobe is bordered posteriorly with light brown or with irregular cross bars which are much lighter than in *U. luzonius* and the second spine of dorsal appears to be slightly higher than in *U. luzonius*.

292. *Upeneus arge* Jordan and Evermann

Upeneus arge Jordan and Evermann, Bull. U.S. Fish. Comm., **22**, p. 187, 1903. Lachner, Proc. U.S. Nat. Mus., **103**, p. 518, pl. 14, fig. A, 1954. Smith and Smith, Fishes of Seychelles, p. 22, pl. 88 G, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, **7**, p. 113, fig. 7, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/238).

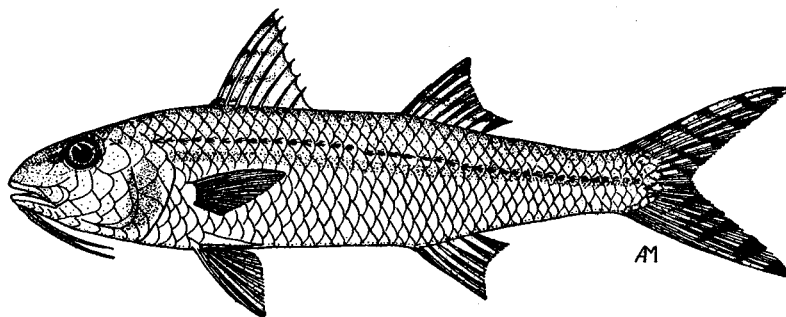


FIG. 292. *Upeneus arge* Jordan and Evermann, 139 mm. (after Jones and Kumaran)

Specimens studied: Agathi (1), 146 mm. Kavarathi (1), 139 mm. Kiltan (1), 209 mm. Minicoy (1), 138 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 13-14; V. I, 5. Ll. 38-39; Ltr. 2½ +1+7. GR. 5-6+1+14-16.

Head 3.6-4.1 in standard length, 4.8-5.2 in total length. Depth of body 4.1-4.4 in standard length, 5.3-5.6 in total length. Eye 4.5-5.0 in head, 1.7-2.0 in snout and 1.4-1.5 in nearly flat interorbital space. Maxillary reaching to below anterior third of eye. A prominent swelling on snout in front of eye. Barbels scarcely reaching hind border of preopercle. Teeth in villiform bands in jaws; teeth present on vomer and palatines. Preorbital without scales. First dorsal spine minute, second spine longest, much longer than head without snout. Pectoral equal to head without snout or slightly longer. Colour: Uniformly milky white, slightly dusky on back. A pale horizontal lateral stripe from operculum to caudal base. Spinous dorsal transparent, dusky distally with traces of two longitudinal dusky bars below; soft dorsal transparent with 3 indistinct dusky bars; caudal with 6 oblique black bars on upper lobe and 5 black bars on lower lobe, the outer two bars on the lower lobe much broader than others. Other fins transparent.

Local names: *Thelakanthi* (Minicoy). *Manakkam* (other islands).

Distribution: Seychelles and Laccadives in the Indian Ocean and Caroline, Gilbert, Phoenix, Palmyra and Hawaiian Islands in the Pacific.

293. *Mulloidichthys samoensis* (Günther)

Mulloides samoensis Günther, *Fische der Sudsea*, 1, p. 57, pl. 43, fig. B, 1874.

Mulloidichthys samoensis Weber and de Beaufort, *Fishes of the Indo-Australian Archipelago*, 6, p. 374, 1931 (synonymy in part). Smith, *Fishes of Southern Africa*, p. 231, pl. 28, fig. 573, 1949. Balan, *J. Bombay nat. Hist. Soc.*, 55, p. 301, 1958. Jones, *Bull. cent. mar. Fish. Res. Inst.*, 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/239).

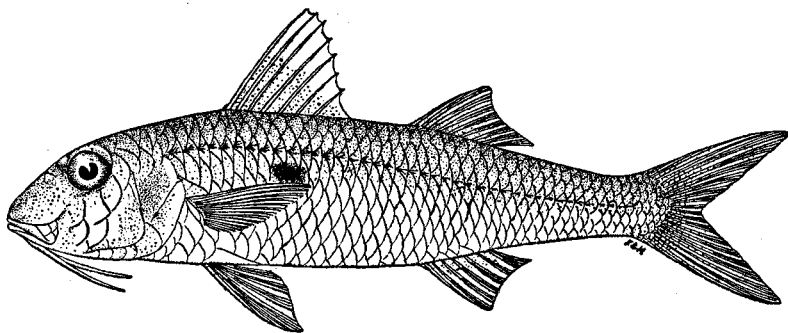


FIG. 293. *Mulloidichthys samoensis* (Günther), 165 mm.

Specimens studied: Agathi (8), 116 to 187 mm. Ameni (6), 85 to 175 mm. Bitra (1), 112 mm. Chetlat (3), 122 to 160 mm. Kadamat (6), 85 to 200 mm. Kalpeni (1), 152 mm. Kavarathi (14), 78 to 141 mm. Minicoy (13), 68 to 210 mm. Pitti (1), 102 mm. Thinnakara (1), 131 mm.

D₁. VIII; D₂ i, 8; A. I, i, 6; P. 16-17; V. I, 5. Ll. 36-40; Ltr. 2½ +1+6½. GR. 7-9+1+16-20.

Head 3.2-3.6 in standard length, 4.1-4.5 in total length. Depth of body 3.9-4.6 in standard length, 5.0-5.8 in total length. Eye 3.7-4.4 in head, 1.6-1.8 in snout and 1.1-1.4 in somewhat flat interorbital space. Teeth in jaws small, in a villiform band; vomer and palatines edentulous. Maxillary short, not reaching a vertical through anterior border of eye. Barbels nearly reaching preopercular margin. Pectoral equal to head without snout or slightly longer. Ventral as long as pectoral. First dorsal spine minute or obsolete, second spine generally a little longer than pectoral. Colour: Uniformly yellowish white, a little darker above. A dark blotch below lateral line on 7th-9th or 8th-10th scales from operculum. An indistinct median longitudinal yellowish band from operculum to base of caudal often present in fresh specimens. Fins hyaline.

Local names: *Thelakanthi* (Minicoy). *Manakkam* (other islands).

Distribution: Red Sea and east coast of Africa through Laccadives to Indonesia, Tahiti, Samoa, Marquesas and Hawaiian Islands.

294. *Mulloidichthys auriflamma* (Forskål)

Mullus auriflamma Forskål, Descript. Animal., p. 30, 1775.

Mulloides flavolineatus Day, Fishes of India, p. 122, pl. 30, fig. 6, 1878.

Mulloidichthys auriflamma Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 376, 1931. Smith, Fishes of Southern Africa, p. 231, pl. 25, fig. 572, 1949. Munro, Fishes of Ceylon, p. 163, pl. 32, fig. 481, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Proc. Symposium on Scombroïd Fishes, p. 663, fig. 29, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/240).

Specimens studied: Agathi (1), 175 mm. Ameni (4), 114 to 152 mm. Bitra (2), 121 and 132 mm. Chetlat (1), 122 mm. Kalpeni (3), 75 to 120 mm. Kavarathi (2), 159 and 177 mm. Minicoy (7), 70 to 180 mm.

D₁. VIII; D₂ i, 8; A. I, i, 6; P. 16-17; V. I, 5. Ll. 36-39; Ltr. 2½ +1+6½. GR. 7-9+1+19-23.

Head 3.2-3.5 in standard length, 4.2-4.4 in total length. Depth of body 3.7-4.1 in standard length, 4.9-5.2 in total length. Eye 3.3-3.8 in head, 1.3-1.6 in blunt snout and 1.0-1.2 in interorbital space. Maxillary not reaching vertical through front border of eye. Teeth small, in villiform bands anteriorly and in a single row posteriorly, none on vomer and palatines. Barbels reaching preopercle margin. Pectoral as long as ventral, equal to snout and eye together or a little longer. First dorsal spine minute or obsolete, second and third subequal.

Colour: Dull olivaceous above, sides and below yellowish white. Fresh specimens rosy with a yellowish lateral band from eye to caudal base. Fins yellowish hyaline.

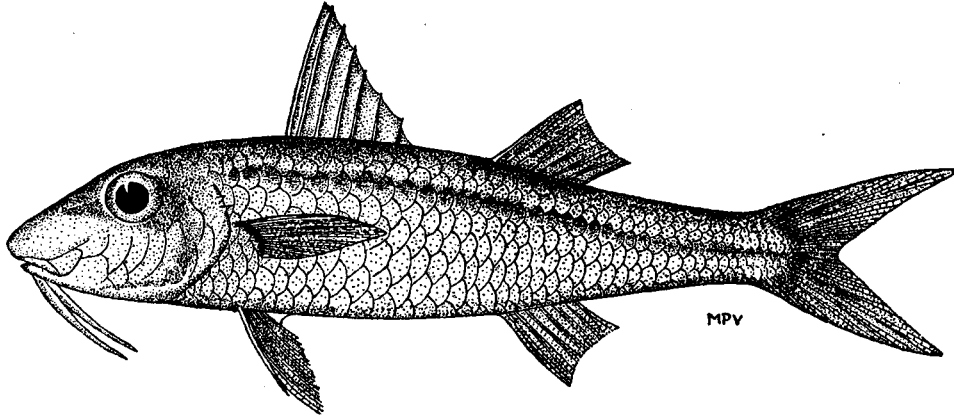


FIG. 294. *Mulloidichthys auriflamma* (Forsk.) 150 mm.

Local names: *Rheenduthelakanthi* (Minicoy.) *Manhamahakkam* (other islands).

Distribution: Widely distributed from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Japan, south to Australia and east to Marquesas and Hawaiian Islands.

295. *Parupeneus barberinus* (Lacépède)

Mullus barberinus Lacépède, Hist. Nat. Poissons, 3, p. 406, pl. 13, fig. 3, 1802.

Parupeneus barberinus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 392, fig. 77, 1931. Munro, Fishes of Ceylon, p. 165, pl. 32, fig. 486, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 663, fig. 30, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/241).

Pseudupeneus barberinus Smith, Fishes of Southern Africa, p. 229, pl. 27, fig. 566, 1949.

Upeneus barberinus Day, Fishes of India, p. 124, 1878.

Specimens studied: Agathi (11), 46 to 237 mm. Ameni (7), 45 to 135 mm. Androth (3), 34 to 176 mm. Chetlat (1), 65 mm. Kavarathi (4), 34 to 72 mm. Kalpeni (2), 91 and 135 mm. Kiltan (2), 83 and 112 mm. Minicoy (21), 33 to 165 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 16-17; V. I, 5. Ll. 28-30; Ltr. 2½ + 1 + 6½. GR. 5-7 + 1 + 18-21.

Head 2.9-3.1 in standard length, 3.7-4.0 in total length. Depth of body 3.3-3.6 in standard length, 4.3-4.7 in total length. Eye 4.5-6.4 in head, 2.0-3.5

in snout and 1.1-1.5 in convex interorbital space. Maxillary reaching $\frac{2}{3}$ in snout. Teeth strong, in a single series in jaws, none on vomer and palatines. Barbels reaching to preoperculum or a little beyond. First dorsal spine minute, second dorsal spine flexible, slightly shorter than third, it being more or less than snout and eye together. Pectoral shorter than ventral. Colour: Dorsal portion of head and body dusky tan, sides and below white; a black horizontal stripe from snout through eye, on dorsolateral portion of body, ending below last dorsal ray or on upper portion of caudal peduncle; a large black spot at base of caudal. First dorsal pale to dusky, soft dorsal often with an indistinct sub-basal dark stripe, otherwise transparent; other fins transparent.

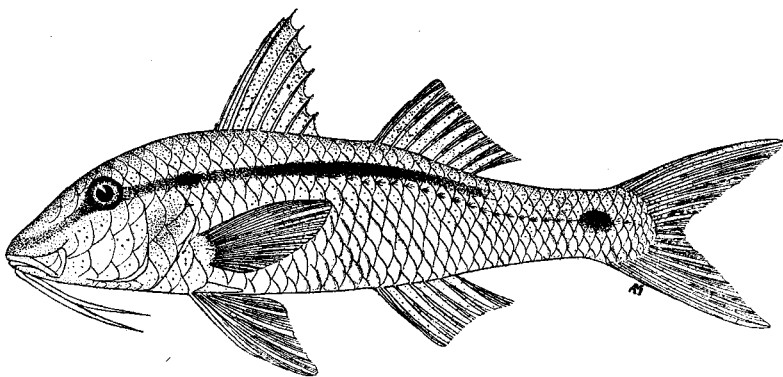


FIG. 295. *Parupeneus barberinus* (Lacépède), 140 mm.

Local names: *Kaluoh* (Minicoy). *Manakkam* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Ryukyus, Japan, Australia and Samoa, Society, Tuamotu and Hawaiian Islands.

296. *Parupeneus indicus* (Shaw)

Mullus indicus Shaw, General Zoology, 4, p. 614, 1803.

Parupeneus indicus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 394, 1931. Munro, Fishes of Ceylon, p. 164, pl. 32, fig. 484, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/242).

Parupeneus malabaricus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 395, 1931.

Pseudupeneus indicus Smith, Fishes of Southern Africa, p. 230, pl. 27, fig. 567, 1949.

Upeneus indicus Day, Fishes of India, p. 126, pl. 31, fig. 4, 1878.

Specimens studied: Agathi (5), 63 to 100 mm. Ameni (2), 63 and 68 mm. Chetlat (1), 57 mm. Kavarathi (1), 128 mm. Minicoy (8), 39 to 66 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 16; V. I, 5. Ll. 29-30; Ltr. 2½+1+6½. GR. 5-6+1+19-21.

Head 2.9-3.1 in standard length, 3.7-3.9 in total length. Depth of body 3.4-3.6 in standard length, 4.3-4.6 in total length. Eye 4.3-6.2 in head, 2.0-3.3 in snout and 1.2-1.5 in convex interorbital space. Maxilla more than $1/2$ eye diameter distant from vertical through front border of eye. Teeth strong in a single row in jaws, no teeth on vomer and palatines. Barbels long, extending slightly behind hind margin of preoperculum. First dorsal spine minute, second shorter than third, equalling snout and half eye diameter together. Pectoral slightly shorter than ventral. Colour: Slightly brownish above, lighter to yellowish below with an oblong yellow blotch on lateral line below and behind posterior half of spinous dorsal and a black spot in lateral line on posterior half of caudal peduncle. In fresh specimens 3-4 light violet lines are evident on upper part of head. Fins hyaline, second dorsal with 2-3 dusky to dark longitudinal stripes and 1-2 indistinct stripes sometimes present on anal.

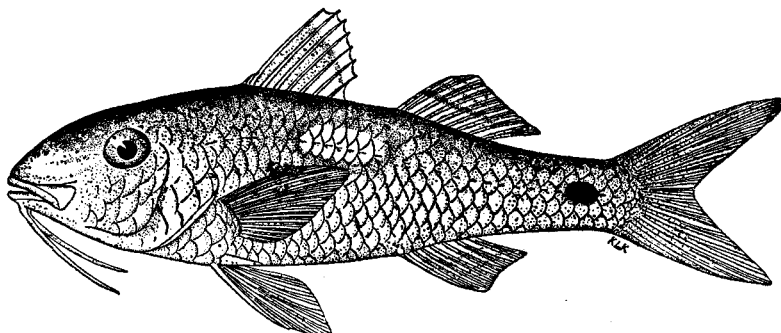


FIG. 296. *Parupeneus indicus* (Shaw), 83 mm.

Local names: *Thelakanthi* (Minicoy). *Manakkam* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Ryukyu, Japan, Fiji, Samoa and Tonga Islands.

297. *Parupeneus pleurostigma* (Bennett)

Upeneus pleurostigma Bennett, Proc. Zool. Soc., London, p. 59, 1831.

Parupeneus pleurostigma Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 398, 1931. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 387, fig. 9, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16 (Cat. No. CMFRI-LA-F. 83/243).

Pseudupeneus brandesii Smith and Smith, Fishes of Seychelles, p. 22, pl. 88, D, 1963.

Pseudupeneus pleurostigma Smith, Fishes of Southern Africa, p. 230, 1949.

Specimens studied: Bitra (3), 159 to 172 mm.

D₁. VIII: D₂. i, 8; A. I, i, 6; P. 16; V. I, 5. Ll. 30; Ltr. $2\frac{1}{2} + 1 + 6\frac{1}{2}$. GR. $5 + 1 + 19 - 21$.

Head 3.1-3.2 in standard length, 3.8-4.0 in total length. Depth of body 3.7-3.8 in standard length, 4.7-4.8 in total length. Eye 4.8-5.2 in head, 2.4-2.7

in snout and 1.3-1.5 in slightly convex interorbital space. Maxilla reaching $3/4$ eye diameter before eye. Barbels nearly reaching a vertical from the hind border of preoperculum. Teeth in a single series in jaws, no teeth on vomer and palatines. First spine of dorsal minute, second shorter than third, it being about equal to snout and $2/3$ eye together. Ventral equal to or slightly longer than pectoral. Depth of caudal peduncle about $1/2$ its length. Colour: Greyish to dusky above, sides of head and body yellowish to orange red; a black blotch on lateral line below interspace between 7th dorsal spine and origin of soft dorsal, immediately behind it an oblong yellow blotch mostly above the lateral line and an obscure dark area below and behind base of last dorsal rays. Fins yellowish; base of soft dorsal broadly black with narrow blackish bands above, anal with pale to dusky bands, upper and lower edges of caudal greyish to dusky.

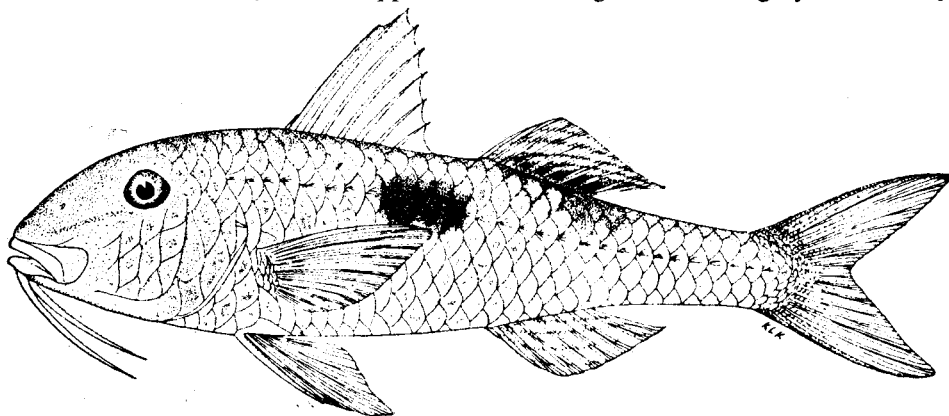


FIG. 297. *Parupeneus pleurostigma* (Bennett), 172 mm. (after Jones and Kumaran)

Local name: *Manakkam* (Bitra).

Distribution: East coast of Africa and neighbouring Islands to the Laccadives, Indonesia, Philippines, Japan and Marshall, Gilbert, Tahiti and Hawaiian Islands.

298. *Parupeneus chryserydros* (Lacépède)

Mullus chryserydros Lacépède, Hist. Nat. Poissons, 3, p. 406, 1802

Mullus radiatus Shaw, General Zoology, 4, p. 618, 1803.

Parupeneus chryserydros Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 404, 1931. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/244).

Pseudupeneus chryseredros Smith and Smith, Fishes of Seychelles, p. 22, pl. 88, fig. E, 1963.

Specimens studied: Bitra (1), 270 mm. Kavarathi (1), 124 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 16; V. I, 5. Ll. 30; Ltr. $2\frac{1}{2}+1+6\frac{1}{2}$.
GR. 5-6+1+20-21.

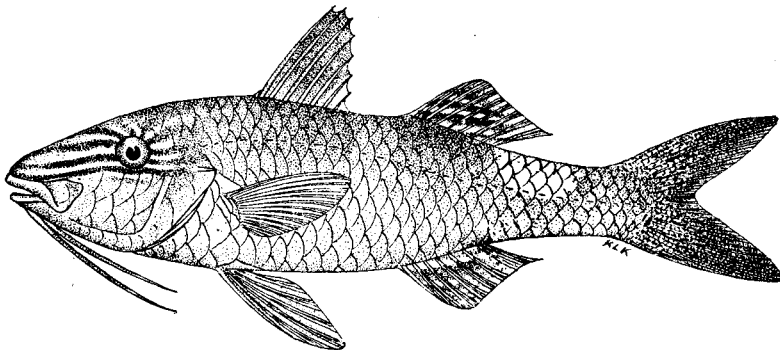


FIG. 298. *Parupeneus chryserydros* (Lacépède), 124 mm.

Head 3.0-3.1 in standard length, 3.7-3.8 in total length. Depth of body 3.5-3.6 in standard length, 4.5-4.6 in total length. Eye 5.7-7.0 in head, 3.0-4.1 in snout and 1.3-1.7 in convex interorbital space. Maxillary extending about an eye diameter from front of eye. Teeth stout, in a single series in jaws, no teeth on vomer and palatines. Barbels nearly reaching base of ventrals. First dorsal spine minute, second and third dorsal spines subequal, equal to snout and half eye together. Ventral longer than pectoral, equal to snout and eye together. Head and body yellowish brown, slightly lighter below with a yellowish saddle dorsally on caudal peduncle and bluish lines radiating from eye. These lines from eye not very prominent in the large specimen. Spinous dorsal and caudal dusky tan; soft dorsal and anal with 4-5 dark streaks; pectoral pale, ventral pale to dusky; hind part of caudal in the large specimen with several dark streaks.

Local name: *Manjalmanakkam* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines and Ryukyu, Solomon, Samoan, Society and Hawaiian Islands.

299. *Parupeneus luteus* (Valenciennes)

Upeneus luteus Cuvier and Valenciennes, Hist. Nat. Poissons, 7, p. 521, 1831. Day, Fishes of India, p. 125, pl. 31, fig. 2, 1878.

Parupeneus luteus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 401, 1931. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMF RI-LA-F. 83/245).

Pseudupeneus luteus Munro, Fishes of Ceylon, p. 165, pl. 32, fig. 488, 1955.

Specimens studied: Bitra (3), 205 to 265 mm. Kadamat (2), 177 and 202 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 16; V. I, 5. Ll. 29-30; Ltr. $2\frac{1}{2}+1+6\frac{1}{2}$. GR. $5+1+19-23$.

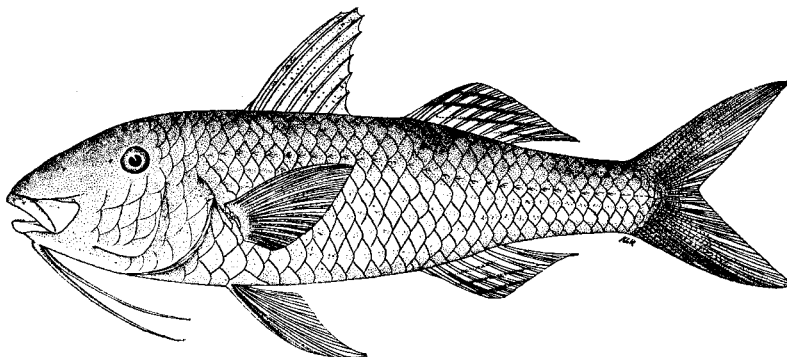


FIG. 299. *Parupeneus luteus* (Valenciennes), 265 mm.

Head 3.0-3.2 in standard length, 3.7-3.9 in total length. Depth of body 3.5-3.7 in standard length, 4.4-4.7 in total length. Eye 5.5-7.0 in head, 2.8-3.8 in snout and 1.5-1.8 in convex interorbital space. Maxilla more than an eye diameter distant from front border of eye. A single series of conical teeth in jaws; vomer and palatines edentulous. Barbels extending almost to hind margin of operculum. First dorsal spine small, third spine longest, slightly less than snout and eye diameter together. Pectoral slightly shorter than ventral, it being equal to snout and eye together. Colour: Uniformly yellowish to rosy. Fresh specimens sometimes with pale longitudinal lines along upper side of head. Fins yellowish, soft dorsal and anal with traces of 3-4 brownish longitudinal bands.

Local name: *Manjalmanakkam* (other islands).

Distribution: Red Sea, east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Taiwan.

300. *Parupeneus macronemus* (Lacépède)

Mullus macronema Lacépède, Hist. Nat. Poissons, 3, p. 383 and 404, pl. 13, fig. 2, 1802.
Parupeneus macronema Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 388, 1931. Jones, Proc. Symposium on Scombroid Fishes, p. 664, fig. 32, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/246).

Parupeneus macronemus Munro, Fishes of Ceylon, p. 164, pl. 32, fig. 485, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959.

Pseudupeneus macronema Smith, Fishes of Southern Africa, p. 229, fig. 565, 1949. Balan, J. Bombay nat. Hist. Soc., 55, p. 301, 1958.

Upeneus macronemus Day, Fishes of India, p. 123, pl. 31, fig. 1, 1878.

Specimens studied: Agathi (10), 45 to 78 mm. Ameni (5), 40 to 85 mm. Kalpeni (1), 142 mm. Kadamat (7), 55 to 130 mm. Kavarathi (7), 63 to 126 mm. Kiltan (1), 84 mm. Minicoy (13), 50 to 145 mm.

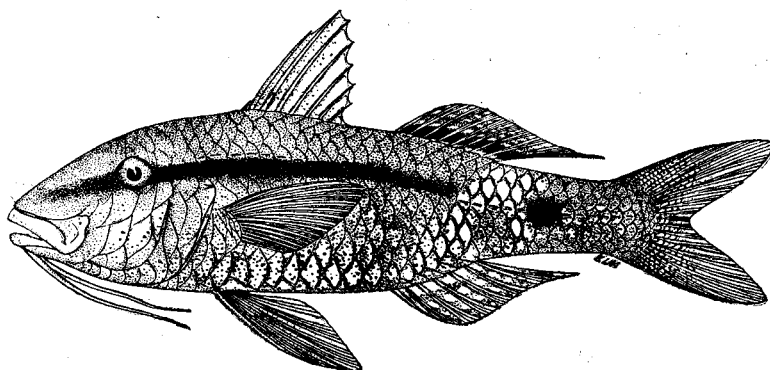


FIG. 300. *Parupeneus macronemus* (Lacépède), 140 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 16-17; V. I, 5. LI. 29-31; Ltr. 2½ + 1 + 6½. GR. 7-8 + 1 + 23-25.

Head 2.8-3.2 in standard length, 3.6-4.0 in total length. Depth of body 3.3-3.6 in standard length, 4.2-4.6 in total length. Eye 4.4-5.7 in head, 2.2-3.1 in snout and 1.2-1.5 in interorbital space. Teeth strong, widely spaced in a single series in jaws, no teeth on vomer and palatines. Barbels extending to a vertical from the level of opercular border. First dorsal spine minute, second strong but flexible at tip and much shorter than third, it being equal to snout and ½ eye diameter together. Pectoral shorter than ventral by about ½ eye diameter. Last ray of dorsal and anal elongated in large specimens. Colour: Upper sides of head and body light tan to dusky; sides and below whitish, a broad black horizontal stripe from snout through eye ending below posterior rays of second dorsal or dorsolateral portion of caudal peduncle; a large black spot on caudal peduncle. In some fresh specimens sides of abdomen rosy and a light area present posterior to the base of soft dorsal. Anterior margin of spinous dorsal dusky, rest of the fin light. Soft dorsal with a broad blackish basal band, rest of the fin light tan and often with light stripes. Anal pale to light tan, sometimes with stripes. Caudal transparent, upper and lower border blackish.

Local names: *Kaluoh* (Minicoy). *Manakkam* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Tahiti and Hawaiian Islands.

301. *Parupeneus trifasciatus* (Lacépède)

Mullus trifasciatus Lacépède, H.st. Nat. Poissons, 3, p. 404, pl. 15, fig. 3, 1804.

Parupeneus trifasciatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 382, 1931. Munro, Fishes of Ceylon, p. 164, pl. 32, fig. 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, 16, 1969 (Cat. No. CMFRI-LA-F. 83/247).

Upeneus multifasciatus Day, Fishes of India, p. 124, 1878 (not of Quoy and Gaimard),

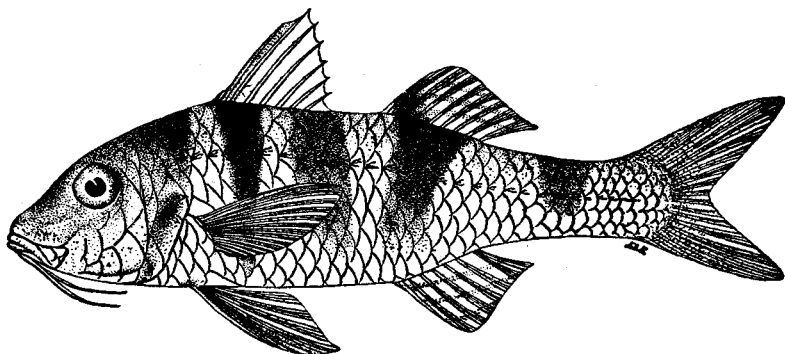


FIG. 301. *Parupeneus trifasciatus* (Lacépède), 86 mm.

Specimens studied: Kadamat (1), 86 mm. Minicoy (4), 80 to 102 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 16; V. I, 5. Ll. 30; Ltr. $2\frac{1}{2}+1+6\frac{1}{2}$

Head 3.3 in standard length, 4.2 in total length. Depth of body 3.3 in standard length, 4.2 in total length. Eye about 4 in head, 1.6 in snout and 1.2 in convex interorbital space. Maxillary not reaching vertical through front border of eye. Barbels nearly reaching preopercle border. Teeth in a single row in jaws, no teeth on vomer and palatines. First spine of spinous dorsal minute, second shorter than third, it being a little shorter than snout and eye together. Ventral half eye diameter shorter than head and longer than pectoral. Colour: Brownish on back, sides and below pale yellowish with 5 broad black cross bands; first before dorsal, second below anterior spines of first dorsal, third below posterior spines of soft dorsal, fourth below second dorsal spreading on to the anterior rays of that fin and the fifth over caudal peduncle. An indistinct dark stripe from snout to eye. Membrane between first three spines dark, rest of the fin transparent. Pectoral transparent. Ventral with dark spots. Outer border of caudal dusky.

Local name: *Kalmanakkam* (Kadamat).

Distribution: Madagascar, Mauritius, Laccadives, coasts of India, Indonesia, to the Philippines, Ryukyus, Japan and Caroline, Solomon and Hawaiian Islands.

302. *Parupeneus bifasciatus* (Lacépède)

Mullus bifasciatus Lacépède, Hist. Nat. Poissons, 3, p. 404, pl. 14, fig. 2, 1801.

Parupeneus bifasciatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 6, p. 386, 1931 (in part). Munro, Fishes of Ceylon, p. 164, pl. 32, fig. 482, 1955.

Jones, Proc. Symposium on Scombroid Fishes, p. 664, fig. 31, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 16, 1969 (Cat. No. CMFRI-LA-F. 83/248).

Pseudupeneus bifasciatus Smith and Smith, Fishes of Seychelles, p. 22, pl. 88, F, 1963.

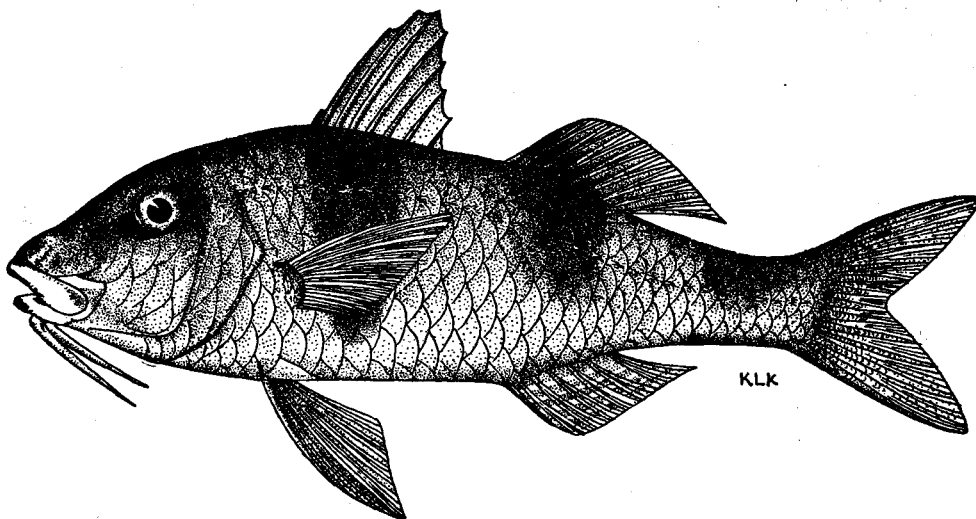


FIG. 302. *Parupeneus bifasciatus* (Lacépède), 145 mm.

Specimens studied: Agathi (5), 131 to 163 mm. Ameni (2), 73 and 185 mm. Chetlat (1), 87 mm. Kadamat (1), 106 mm. Kavarathi (3), 80 to 157 mm. Minicoy (4), 45 to 168 mm. Suheli (2), 151 and 153 mm.

D₁. VIII; D₂. i, 8; A. I, i, 6; P. 16-17; V. I, 5. Ll. 28-31; Ltr. 2½ + 1 + 6½. GR. 6-8 + 1 + 24-28.

Head 3.0-3.3 in standard length, 3.8-4.3 in total length. Depth of body 3.0-3.2 in standard length, 3.8-4.2 in total length. Eye 4.2-4.9 in head, 1.8-2.5 in snout and 1.1-1.4 in convex interorbital space. Maxillary not reaching vertical through front border of eye; terminal depth of maxilla less than eye diameter. Teeth in jaws uniserial, stout and widely spaced, no teeth on vomer and palatines. Barbels reaching hind margin of preoperculum. First spine of dorsal minute, second shorter than third, it being equal to or a little shorter than length of snout and eye together. Soft dorsal and anal truncate, last ray not produced. Ventral longer than pectoral, about 1/3 length of snout shorter than head. Upper sides of head and body slightly brownish, whitish below with three incomplete blackish cross bands, the first below spinous dorsal, second below soft dorsal

and the third on upper half of caudal peduncle. In fresh specimens, sides of abdomen and opercle often rosy. Spinous dorsal dusky anteriorly, rest of the fin almost transparent. Soft dorsal often with 4-5 dark bands and anterior rays blackish basally. Anal whitish with 5-6 dark bands. Pectoral and ventral transparent to dusky.

Local names: *Galikaluoh* (Minicoy). *Kalmanakkam* (other islands).

Distribution: Seychelles, Reunion, Madagascar and Mauritius in the Western Indian Ocean, Laccadives, Ceylon, Indonesia, Philippines and Ryukyu, Caroline, Solomon, Samoan and Society Islands.

Family PEMPHERIDAE

Oblong to elliptical body, compressed. Snout short and blunt. Mouth protractile, usually oblique. Teeth in jaws small in several rows; teeth present on vomer and palatines. A short dorsal fin with IV-VI spines and a few rays. Anal long with II-III spines and numerous rays. Pectorals with a scaly axillary process. Scales small or moderate, ctenoid or cycloid. Lateral line complete, ending on caudal fin. Gill membranes separate and free from isthmus. Six or seven branchiostegals; pseudobranchiae present.

Depth 2.3-2.4 in length. 40-43 anal rays *Pempheris oualensis*
 Depth 2.9-3.0 in length. 21-22 anal rays *Parapriacanthus guentheri*

303. *Pempheris oualensis* Cuvier

Pempheris oualensis Cuvier and Valenciennes, Hist. Nat. Poissons, 7, p. 299, 1831. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 216, fig. 55, 1936. Smith, Fishes of Southern Africa, p. 248, pl. 34, fig. 642, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 92/249).

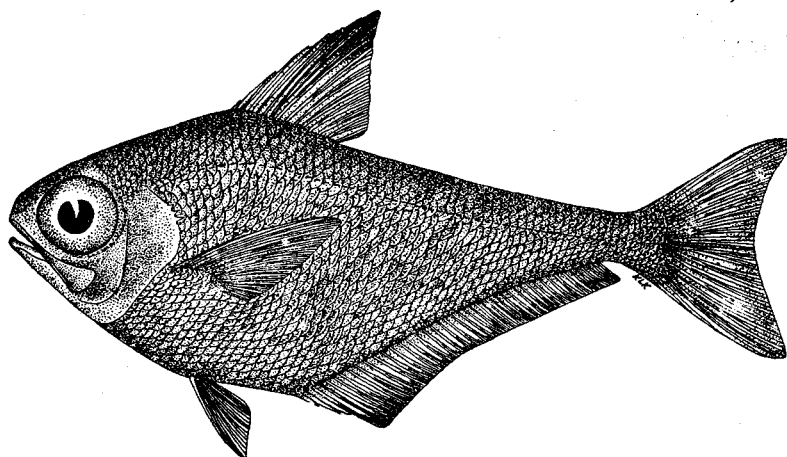


FIG. 303. *Pempheris oualensis* Cuvier, 108 mm.

Specimens studied: Ameni (5), 56 to 108 mm. Kalpeni (9), 37 to 99 mm. Kavarathi (8), 45 to 86 mm. Minicoy (7), 78 to 115 mm.

D. VI, 9; A. III, 40-43; P. 18. Ll. 58-62. GR. 8+1+20-21.

Rostrrodorsal profile slightly convex behind; ventral profile upto ventral strongly convex. Head 3.3-3.6 in standard length, 4.3-4.5 in total length. Depth of body 2.3-2.4 in standard length, 2.7-2.9 in total length. Eye 2.2-2.4 in head, 0.3 in snout and 0.7-0.8 in interorbital space. Maxillary reaching almost to below hind border of eye. Predorsal distance much less than depth of body. Pectoral equal to or slightly shorter than head. Teeth conspicuous, outer series on intermaxillary and mandible strongest, those on mandible directed outwards. Colour: Head and back brownish, lighter below, scales with bronze coloured spots. Dorsal with blackish front border, more so at tip. Anal uniform light with bronze coloured margin; outer margin of caudal dark. Pectoral and ventral lighter, pectoral base blackish.

Local names: *Ammasabodi* (Minicoy). *Ambatta*, *Kulakkathi* (other islands).

Distribution: From the east coast of South Africa to the Laccadives, Indonesia, Philippines and Okinawa (Ryukyus), Samoan and Caroline Islands and Australia.

304. *Parapriacanthus guentheri* (Klunzinger)

Pempherichthys guntheri Klunzinger, Verh. Zool., bot. Ges. Wien, **21**, p. 470, 1871.

Parapriacanthus guentheri Smith, Fishes of Southern Africa, p. 247, fig. 640, 1949. Jones and Kumaran, J. Mar. biol. Ass. India, **8**, p. 172, fig. 11, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 17, 1969 (Cat. No. CMFRI-LA-F. 92/250).

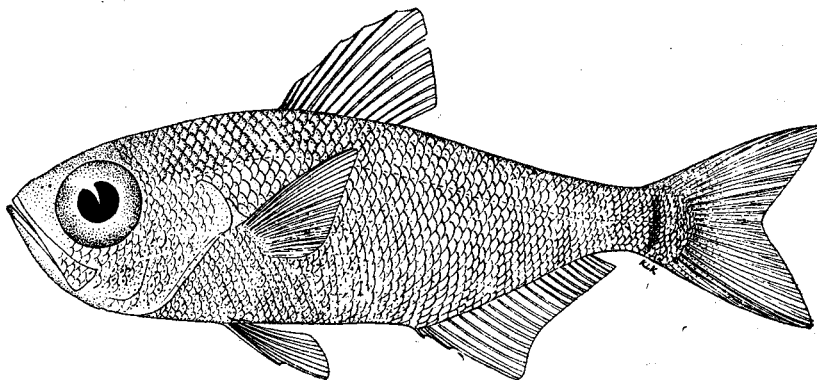


FIG. 304. *Parapriacanthus guentheri* (Klunzinger), 50 mm. (after Jones and Kumaran)

Specimens studied: Agathi (13), 41 to 58 mm. Ameni (9), 35 to 48 mm. Androth (5), 53 to 60 mm. Minicoy (19), 34 to 51 mm.

D. V, 9; A. II-III, 21-22; P. 15-16; V. I, 5. Ll. 68-74; Ltr. 6+1+16-17. GR. 5+1+14-16.

Body moderately deep, ovate, compressed. Head 2.7-2.9 in standard length, 3.4-3.6 in total length. Depth of body 2.9-3.0 in standard length, 3.6-3.7 in total length. Eye 2.5-2.7 in head, 0.5-0.6 in snout and about 0.7 in slightly convex interorbital space. Teeth small, uniserial in jaws and on palatines, and V shaped on vomer. Preopercle without spines. Maxillary reaching to below or slightly beyond middle of eye. Pectoral equal to or slightly shorter than head without snout. Lateral line not extending to middle of caudal fin rays. Colour: Rosy to light tan, head and lower sides of abdomen yellowish to silvery, tip of lower jaw brownish. Base of caudal fin with a vertical dark line.

Local names: *Ammasabodi*, *Lobodumas* (Minicoy).

Distribution: Red Sea, east coast of South Africa and the Laccadives.

Family KYPHOSIDAE

Body oblong-oval, more or less compressed. Mouth small, slightly protractile. Narrow bands of villiform teeth in jaws with an outer row of strong incisors and fine teeth on vomer, palatines and tongue. Dorsal fin single with X-XI strong spines and 12-15 branched rays. Anal with III strong spines and 11-16 branched rays. Gill membranes separate or united to isthmus. Scales moderate, smaller on head, back and on vertical fins. Lateral line slightly arched anteriorly.

Base of spinous dorsal equal to or slightly longer than that of soft dorsal. D. XI, 12. A. III, 11-12. Anterior dorsal rays much longer than longest dorsal spine *Kyphosus cinerascens*

Base of spinous dorsal equal to or slightly shorter than that of soft dorsal. D. XI, 14. A. III, 12-13. Anterior dorsal rays equal to or shorter than longest dorsal spine *Kyphosus vaigiensis*

305. *Kyphosus cinerascens* (Forskål)

Sciaena cinerascens Forskål, Descript. Animal., p. 53, 1775.

Kyphosus cinerascens Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 224, 1936. Smith, Fishes of Southern Africa, p. 246, fig. 638, 1949. Munro, Fishes of Ceylon, p. 167, pl. 32, fig. 494, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 94/251).

Pimblepterus cinerascens Day, Fishes of India, p. 143, pl. 35, fig. 3, 1878.

Specimens studied: Bitra (1), 132 mm. Chetlat (1), 185 mm. Minicoy (8), 140 to 220 mm.

D. XI, 12; A. III, 11-12; P. 18; V. I, 5. Ll. 62-64; Ltr. 9-10+1+18-19. GR. 7-9+1+18-21.

Head 3.5-3.7 in standard length, 4.5-4.8 in total length. Rostro-dorsal profile convex with a swelling above nostrils. Depth of body 2.2-2.4 in standard length, 2.8-3.1 in total length. Eye 3.5-3.7 in head, 1.0-1.1 in snout and 1.3-1.4 in convex interorbital space. Pectoral as long as head without snout. Ventral slightly shorter than pectoral. Maxillary reaching to front border of eye. Operculum with a blunt spine. A single row of lanceolate teeth in jaws, teeth minute on vomer, palatines and tongue. Base of spinous dorsal much longer than that of soft dorsal. Dorsal rays much higher than highest dorsal spines. Anterior rays of anal longer than longest dorsal spines. Colour: Grey to olivaceous, lighter below with a narrow dark band along each row of scales on sides. A light indistinct band from snout to below eye. Fins grey to brownish. Juveniles with dark edges to dorsal and anal fins.

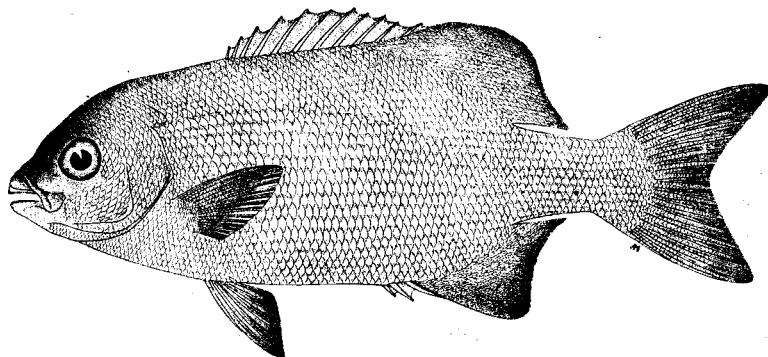


FIG. 305. *Kyphosus cinerascens* (Forskål), 220 mm.

Local names: *Kiruliamas* (Minicoy). *Kakkuratti*, *Punji* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Japan and Marshall, Hawaiian Islands, Easter Island and south to Australia.

306. *Kyphosus vaigiensis* (Quoy and Gaimard)

Pimelepterus vaigiensis Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 386, pl. 62, fig. 4, 1824.

Kyphosus vaigiensis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 227, fig. 58, 1936. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 94/252).

Pimelepterus fuscus Day, Fishes of India, p. 143, 1878. (not of Lacepede).

Specimens studied: Ameni (3), 145 to 194 mm. Bangaram (1), 188 mm. Minicoy (1), 122 mm.

D. XI, 14; A. III, 12-13; P. 18-19; V. I, 5, Ll. 64-68; Ltr. 11+1+18-19. GR. 6-9+1+19-21.

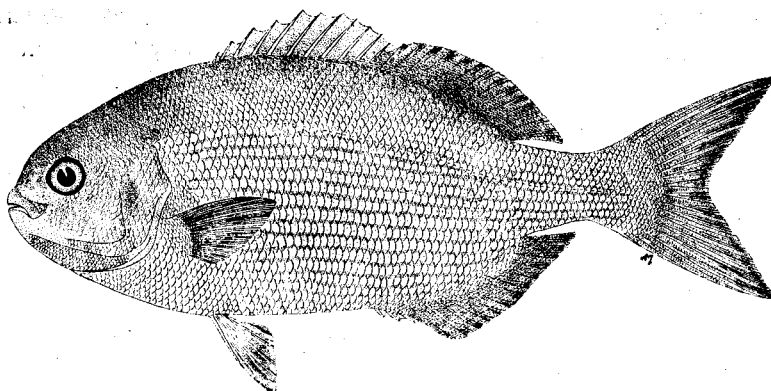


FIG. 306. *Kyphosus vaigiensis* (Quoy and Gaimard), 145 mm.

Head 3.4-3.7 in standard length, 4.4-4.7 in total length. Depth of body 2.3-2.5 in standard length, 2.8-3.1 in total length. Rostro-dorsal profile convex with a swelling above nostrils. Eye 3.5-3.7 in head, 0.9-1.1 in snout and 1.3-1.5 in convex interorbital space. A single row of lanceolate teeth in jaws, teeth minute on vomer, palatine and tongue. Base of soft dorsal equal to or slightly longer than that of spinous dorsal. Dorsal rays equal to or shorter than longest dorsal spines. Anterior rays of anal higher than longest dorsal spines. Pectoral shorter than head without snout. Ventral shorter than pectoral. Colour: Grey to brownish, lighter below, sides with dark longitudinal stripes along scale rows and a light band from snout to below eye. Fins grey.

Local names: *Kiruliamas* (Minicoy). *Kakkuratti*, *Punji* (other islands).

Distribution: Red Sea to the Laccadives, coasts of India, Indonesia, Philippines and Marshall, Samoan and Tahiti Islands.

Family PLATACIDAE

Head and body greatly compressed, rhombic. Head short and high. Mouth small, small tricuspid teeth in jaws, sometimes a few teeth on vomer. Six branchiostegals. Pseudobranchiae present. Gill membranes broadly united with isthmus. Anterior rays of dorsal and anal prolonged. Scales ctenoid, very small; scales extending on to the median fins. Lateral line complete, strongly arched.

Middle cusp of teeth larger than the other two. No teeth on vomer. 20 scales between top of lateral line and base of dorsal. D. V, 35-38. A. III, 26-28.

Soft dorsal lobe shorter than standard length *Platax orbicularis*

Three cusps of teeth about equal. A few deciduous teeth on vomer. 26 scales between lateral line and base of dorsal. D. V, 33. A. III, 24. Soft dorsal lobe greater than standard length *Platax teira*

307. *Platax orbicularis* (Forskål)

Chaetodon orbicularis Forskål, Descript. Animal., p. 59, 1775.

Platax orbicularis Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 189, figs. 49 b and 51, 1936. Munro, Fishes of Ceylon, p. 168, pl. 33, fig. 498, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 78/253).

Platax vespertilio Day, Fishes of India, p. 236, pl. 51 A, fig. 5, 1878.

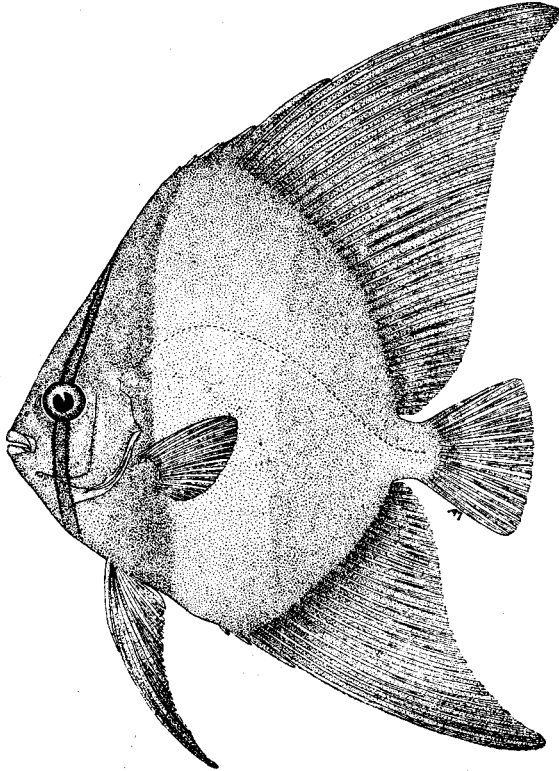


FIG. 307. *Platax orbicularis* (Forskål), 91 mm.

Specimens studied: Agathi (3), 75 to 91 mm. Ameni (2), 65 and 71 mm. Kalpeni (1), 142 mm. Kavarathi (3), 38 to 56 mm. Minicoy (18), 44 to 80 mm.

D. V, 35-38; A. III, 26-28; P. ii, 15-16; V. I, 5. Ll. 54-59; Ltr. 20-22 + 39-43. GR. 8 + 1 + 9-10.

Highly compressed, rhomboidal, anterior profile angular. Head 3.0-3.2 in standard length, 3.8-4.1 in total length. Depth of body 0.9-1.0 in standard length, 1.15-1.25 in total length. Eye 2.8-3.1 in head, 0.8-0.9 in snout and 1.2-1.3 in interorbital space. Teeth long and slender with 3 cusps, the median

one longest. Height of longest rays of soft dorsal much less than standard length, height of longest soft rays of anal shorter than that of soft dorsal. Pectoral $\frac{1}{2}$ length of snout shorter than head. Outer ray of ventral produced, shorter than $\frac{1}{2}$ total length. Colour: Greyish brown with broad dark cross bands, the first through eye often bordered with narrow black broken lines, the second through base of pectoral and a more diffuse and very obscure band from soft dorsal to anal. Dorsal and anal greyish brown, posterior rays distally edged with white in small specimens. Caudal dusky basally, rest of the fin pale yellowish. Pectoral pale yellowish. Ventral blackish.

Local names: *Gundolimas* (Minicoy). *Patha*, *Akoli* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, China, Japan, Australia and to Marshall, Fiji, Samoa and Tuamotu Islands.

308. *Platax teira* (Forskål)

Chaetodon teira Forskål, Descript. Animal, p. 60, 1775.

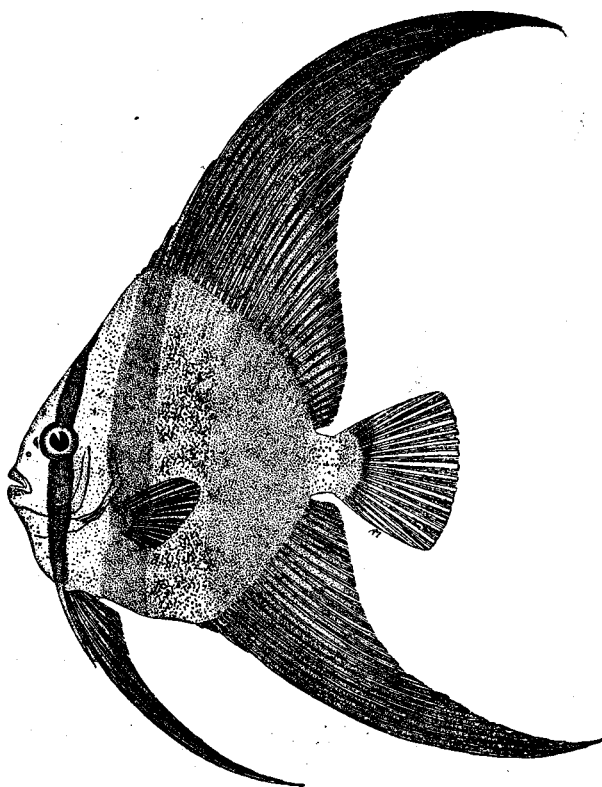


FIG. 308. *Platax teira* (Forskål), 85 mm.

Platax teira Day, Fishes of India, p. 235, pl. 51 B, fig. 4, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 185, figs. 49 a, 50 and 51, 1936. Munro, Fishes of Ceylon, p. 168, pl. 33, fig. 497, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 78/254).

Specimens studied: Minicoy (1), 85 mm.

D. V, 33; A. III, 24; P. iii, 15; V, I, 5. Ll. 63; Ltr. 26+51. GR. 8+1+10.

Highly compressed, rhomboidal, the anterior profile evenly convex. Depth of body equal to standard length, about 1.3 in total length. Head 3 in standard length, 4 in total length. Eye 2.8 in head, 0.7 in snout and about 1.3 in interorbital space. Teeth long, slender with 3 cusps of about equal length. Soft dorsal and anal produced and falcate in young, the former longer than total length and the latter slightly shorter than total length. Pectoral equal to length of head without snout. First ray of ventral produced, about equal to standard length. Colour: Light greyish brown with three broad dark cross bands, the first through eye to before ventral fin, the second from spinous dorsal through base of pectoral to behind vent and the third indistinct from soft dorsal to anal. Dorsal and anal dark greyish; caudal pale; pectoral pale yellowish; ventral blackish.

Local name: *Gundolimas* (Minicoy).

Distribution: East coast of Africa, Red Sea, South Arabia to the Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, China, Japan, Western Australia and Palau Islands.

Family MONODACTYLIDAE

Body deep with feebly ctenoid or cycloid scales extending over median fins. Mouth terminal, small. Small villiform teeth present on jaws, vomer, palatines and tongue. A single dorsal fin with five to eight spines and several branched rays. Anal with three spines. Ventrals thoracic, normal with one spine and five rays or vestigial with a short spine and two to four minute rays.

309. *Monodactylus argenteus* (Linnaeus)

Chaetodon argenteus Linnaeus, Syst. Nat., ed. 10, 1, p. 272, 1758.

Monodactylus argenteus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 207, fig. 54, 1936. Smith, Fishes of Southern Africa, p. 234, fig. 581, 1949. Munro, Fishes of Ceylon, p. 166, pl. 33, fig. 490, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 77/255).

Psettus argenteus Day, Fishes of India, p. 235, pl. 51 B, fig. 5, 1878.

Specimen studied: Agathi (1), 108 mm.

D. VIII, 30; A. III, 30; P. ii, 16; V. I, 4. Ll. 56. GR. 5+1+18.

Body highly compressed, rhombic. Head 2.7 in standard length, 3.6 in total length. Depth of body 1.2 in standard length, 1.55 in total length. Eye 2.8 in head, 0.6 in snout and slightly less than convex interorbital space. Maxilla reaching below front border of eye. Preopercle angular. Pectoral equals postorbital length of head together with $\frac{2}{3}$ eye diameter. Ventral spine short and rays shorter than spine. Colour: Back grey, sides silvery white, a brownish transverse band through eye and another from nape through base of pectoral to before anal. Lobes of dorsal and anal brownish terminally, rest of the fins pale. Pectoral pale, caudal pale yellowish.

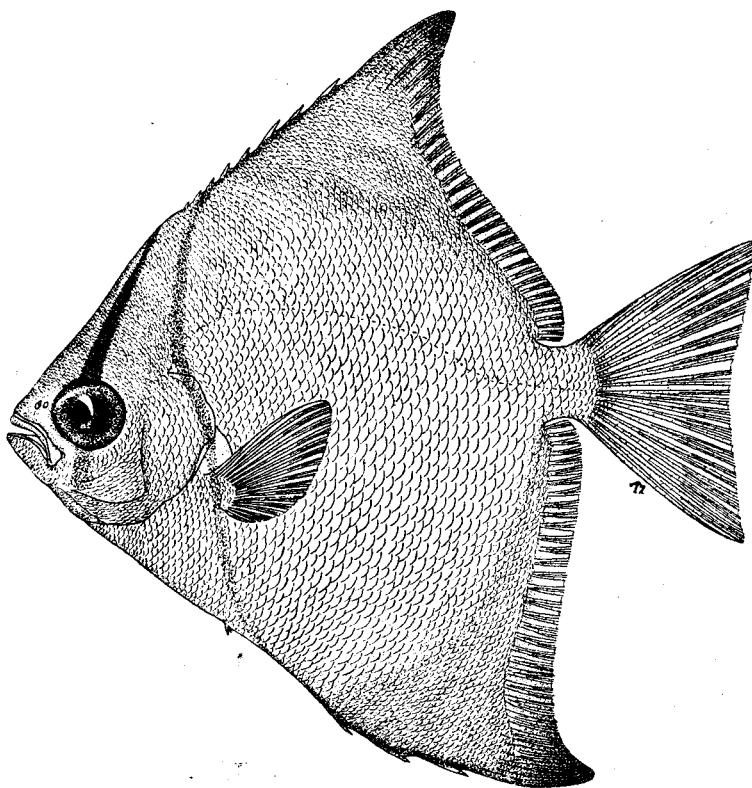


FIG. 309. *Monodactylus argenteus* (Linnaeus), 108 mm.

Local name: *Akoli* (Agathi).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Philippines, China, Australia, Samoan Islands and Fiji. Entering rivers.

Family CHAETODONTIDAE

Head and body strongly compressed, oval or rhomboid. Mouth small, terminal; teeth setiform in brush-like bands in jaws; teeth rarely present on vomer and palatines. Preoperculum entire or denticulate. Gill membranes attached to isthmus. 6 or by exception 7 branchiostegals. Pseudobranchiae large. A single dorsal fin of VI-XVI spines and 15-30 rays. Anal with III-IV or exceptionally V spines and 15-23 rays. Scales moderate or small with regularly rounded posterior border or ciliated. Dorsal and anal especially the soft parts and caudal covered with scales. Lateral line complete or incomplete, more or less strongly arched or angulate.

1. More than 60 scales in a horizontal series. Lateral line reaching caudal. Dorsal XII, 24. Preoperculum weakly serrate *Hemitaurichthys zoster*
Less than 60 scales in a horizontal series. Lateral line ending before or near end of caudal 2
2. Fourth dorsal spine produced. Nape with or without bony prominence .. 3
None of the dorsal spines produced. No bony prominence on nape 4
3. Nape convex without a conical bony prominence. Superior part of dorsal as long as soft. A black band over eye and two black transverse bands across body, one from front of spinous dorsal to ventrals and belly, the second from 5th to 8th dorsal spines downward and backward to posterior half of anal fin *Heniochus acuminatus*
Nape with a median bony prominence. Spinous part of dorsal larger than soft. Three black transverse bands across head and body; the first from front of dorsal to eye, chin and muzzle, second band from fifth to seventh dorsal spines to base of pectoral and belly and the third band less defined from posterior dorsal spines to posterior rays of anal *Heniochus monoceros*
4. Anal spines IV. Middle rays of dorsal and anal prolonged to form acutely angulate fins. Scale rows meeting in acute angle. Upper half of body with two oval white spots; about 20 dark angulate lines along scale rows, the angle directed forwards *Megaprotodon strigangulus*
Anal spines III. Posterior margins of soft dorsal and anal more or less evenly rounded 5
5. Scales with regularly rounded posterior border; scales in horizontal series on sides or sometimes slightly inclined upwards posteriorly in lower half 6
Scales on anterior part of trunk at least with ciliated scales; scales posteriorly on body with rounded posterior border 12
6. XII dorsal spines 7
XIII-XIV dorsal spines 10

7. A black spot between ventrals; three black stripes on head, the first around the mouth, the second from snout to lower edge of interopercle, the third from nape through eye to chest and seven curved black stripes on body; caudal fin with two black transverse stripes *Chaetodon meyer*
 Colour not as above 8
8. Lateral line arched. Lower border of eye below level of gape of mouth. Rostro-dorsal profile concave. A dark brown band from interorbital space across eye to edge of preoperculum; a black bar beginning from 6th to 7th dorsal spine to gill ^{opening} ~~beginning~~ body with 10 to 12 oblique dark bands running upward and backward; soft dorsal and anal with black marginal band *Chaetodon lunula*
 Lateral line angular. Lower border of eye not extending below gape of mouth. Rostro-dorsal profile steeply ascending 9
9. Spinous dorsal longer than soft. Llat. 36-38. A. III, 17-18. A dark brown band from nape through eye, meeting the one from the other side on chest, forming a blotch; side of body with narrow oblique dark line formed by spots; base of first anal rays and back dark brown; soft dorsal and anal with narrow dark submarginal bands.
 *Chaetodon melanotus*
 Spinous dorsal about equal to soft. Llat. 32. A. III, 20-22. Ocular band from nape to lower edge of interopercle with white borders; a brown band on snout; distal parts of soft dorsal and anal with pale, dark and white bands *Chaetodon collaris*
10. Lower border of eye above level of gape of mouth. Spinous dorsal about $1\frac{1}{2}$ times longer than soft. Upper sides of head dark; scales of body with bluish black spots; a dark brown stripe from first dorsal spine through eye to lower margin of interopercle *Chaetodon citrinellus*
 Lower border of eye in level with or below gape of mouth. Spinous dorsal nearly twice longer than soft. Colour not as above 1
11. D. XIV, 17-18. A. III, 6. Llat. 46-47. A blackish blue blotch edged white below posterior dorsal spines crossed by lateral line; a blackish blue ocular band from nape to isthmus; curved blackish blue band from operculum towards origin of anal and another from upper edge of gill opening to above middle of anal *Chaetodon bennett*
 D. XIII, 21-23. A. III, 19-20. Llat. 38-40. A black ocular band bordered with white from nape to isthmus; a black band from below first 2 to 3 dorsal spines to lower margin of preoperculum; 13-14 oblique dark lines on sides of body; dark bands on dorsal and anal and caudal with a broad blackish transverse band *Chaetodon trifasciatus*

- D. XIII-XIV, 24-27. A. III, 22-24. Llat. 38-42. Five or six narrow dark subvertical stripes on sides; dorsal and anal dark violet with white edges; blackish longitudinal streaks between median caudal rays
 *Chaetodon xanthocephalus*
12. XII dorsal spines. Lateral line arched. A black cross bar from nape through eye to interopercle; a black wide triangular area from first four or five dorsal spines to below lateral line and another from last three dorsal spines and front dorsal rays to below lateral line .. *Chaetodon falcula*
- XIII dorsal spines 13
13. Fifth and sixth dorsal rays filamentous. Antero-dorsal part of body with 5-6 oblique dark stripes towards dorsal and anal, 10-11 obliquely descending dark stripes postero-ventrally; a black blotch between 5th or 6th and 11th or 12th dorsal rays *Chaetodon auriga*
- No filamentous dorsal rays 14
14. D. XIII, 25. A. III, 22. Black ocular band united with the one from the other side only on nape; six dark lines from behind upper part of opercle obliquely upwards and the lowest meeting 11 dark lines directed obliquely downwards and backwards; blackish colour of base of soft dorsal extending to the posterior part of body as a vertical band
 *Chaetodon vagabundus*
- D. XIII, 22. A. III, 19. Ocular band meeting the one from the opposite side on nape and chest and extending to base of ventrals; a brownish transverse band below anterior dorsal spines (juveniles)
 *Chaetodon kleini*

310. *Hemitaurichthys zoster* (Bennett)

Chaetodon zoster Bennett, Proc. Comm. Zool. Soc. London, 1, p. 61, 1831.

Hemitaurichthys zoster Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 25, fig. 10, 1936. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Smith and Smith, Fishes of Seychelles, p. 24, pl. 19, N, 1963. Jones, Bull. cent mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 97/256).

Specimens studied: Androth (1), 107 mm. Minicoy (1), 91 mm.

D. XII, 24-25; A. III, 21; P. 17-18; V. I, 5. Llat. 61-63; Ltr. 14-15+30-32.

Head 3.0-3.1 in standard length, 3.7-3.8 in total length. Depth of body 1.5-1.6 in standard length, 1.8-1.9 in total length. Eye 3.2-3.3 in head, 1.2 in

snout and slightly less than highly convex interorbital space. Small brush like teeth in jaws. Angle of preoperculum weakly serrate. Lateral line arched, terminating near caudal base. Median dorsal spines longer and stronger than others. Third anal spine longer than the second. Pectoral slightly longer than head, ventral equal to or shorter than head. Colour: Head and anterior part of body upto level of fifth dorsal spine brown, middle part of body upto ninth or tenth dorsal spine light greyish, posterior part of body brownish. Dorsal except 5th to 9th spines dark brown, anal dark brown, pectoral and ventral dusky hyaline; caudal dull brownish.

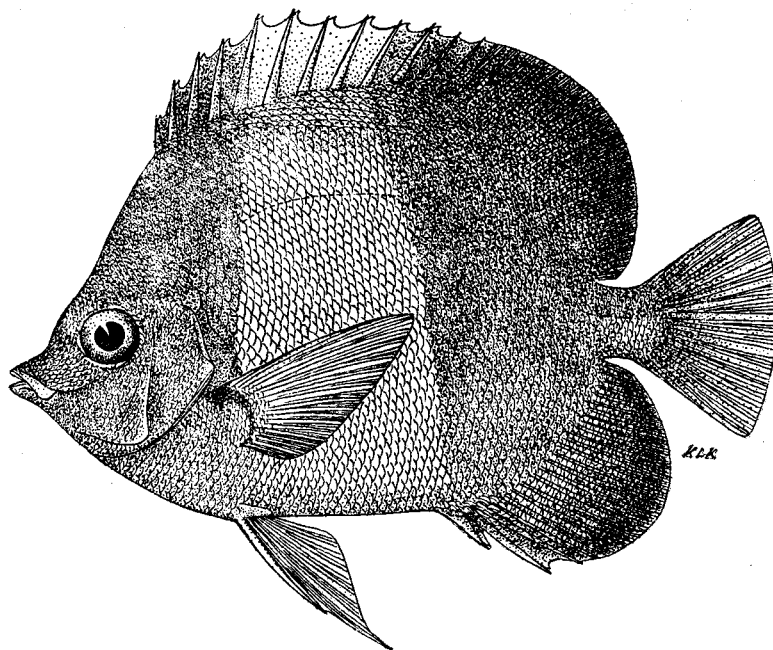


FIG. 310. *Hemitaurichthys zoster* (Bennett), 107 mm.

Local names: *Handupholimas* (Minicoy). *Pakkikkadiya* (Androth).

Distribution: Mauritius and Seychelles in the Western Indian Ocean, Laccadives, Indonesia to the Philippines and Hawaiian Islands.

311. *Heniochus acuminatus* (Linnaeus)

Chaetodon acuminatus Linnaeus, Syst. Nat., ed. 10, p. 272, 1758.

Heniochus acuminatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 37, fig. 12, 1936. Smith, Fishes of Southern Africa, p. 236, pl. 29, fig. 590, 1949. Muaro, Fishes of Ceylon, p. 173, pl. 34, fig. 508, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 97/257).

Heniochus macrolepidotus Day, Fishes of India, p. 110, pl. 28, fig. 3, 1878.

Specimen studied: Minicoy (1), 109 mm.

D. XI, 26; A. III, 19; P. ii, 16; V. I, 5. Ll. 46; Ltr. 10+1+24.

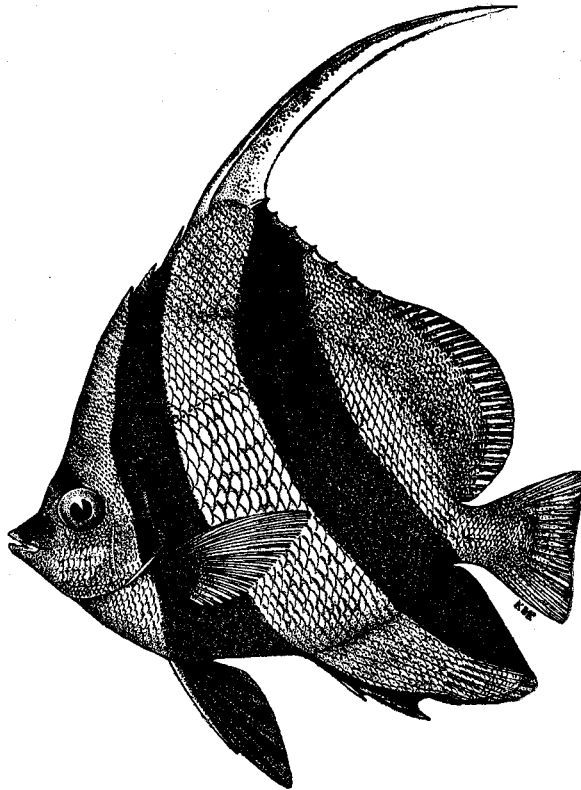


FIG. 311. *Heniochus acuminatus* (Linnaeus), 109 mm.

Head 2.9 in standard length, 3.6 in total length. Depth of body 1.3 in standard length, 1.55 in total length. Eye 3.4 in head, 1.1 in snout and 0.8 in convex interorbital space. Preoperculum finely serrated. Lateral line strongly arched, obliquely descending posteriorly and ending at base of caudal. Fourth dorsal spine and attached membrane greatly prolonged. Soft dorsal rounded posteriorly. Anal angulate. Pectoral about equal to length of head, ventral slightly longer than pectoral. Colour: Pearly white, upper surface of snout dark, a black band over eyes and a wide black band from first three dorsal spines touching operculum and base of pectoral and extending on to the ventrals, belly and lower part of anal fin. A broad black band from 5th to 8th dorsal spines obliquely downwards and extending on to posterior half of anal. Pectoral, soft dorsal and anterior half of anal yellowish; ventral black.

Local name: *Didanegi*, *Chinganchena* (Minicoy).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, China, Japan, Australia and Gilbert, Samoan and Hawaiian Islands.

312. *Heniochus monoceros* Cuvier

Heniochus monoceros Cuvier and Valenciennes, Hist. Nat. Poissons, 7, p. 100, pl. 176, 1831. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 41, 1936. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Smith and Smith, Fishes of Seychelles, p. 24, pl. 15, 1, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 388, fig. 10, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 97/258).

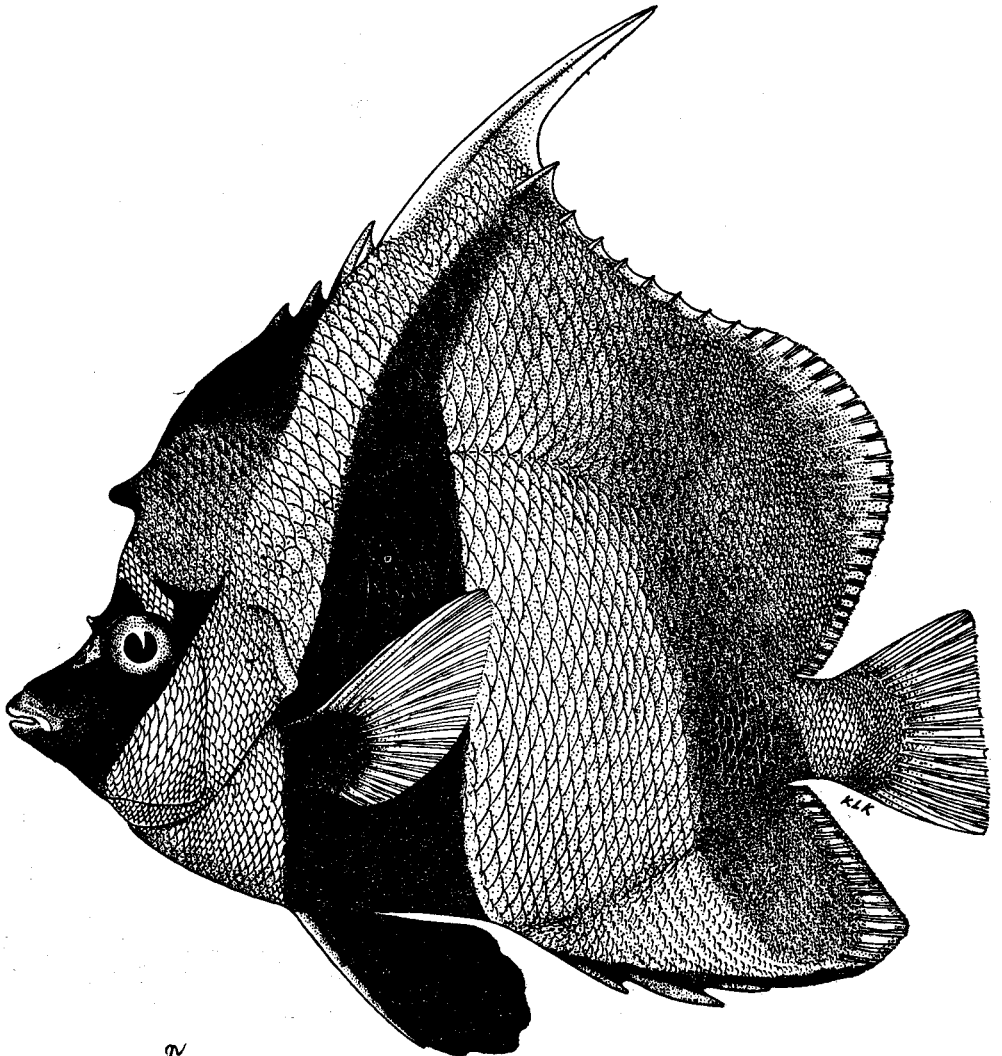


FIG. 312. *Heniochus monoceros* Cuvier, 181 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (3), 181 to 190 mm.

D. XII, 26; A. III, 18; P. ii, 16; V. I, 5. Ll. 56; Ltr. 10+1+25.

Head 2.8 in standard length, 3.4 in total length. Depth of body 1.4 in standard length, 1.7 in total length. Eye 3.6-3.8 in head, 1.3-1.4 in snout and 0.9 in interorbital space. A small protuberance above each eye. Dorsal profile of head concave till median protuberance on nape and convex upto origin of dorsal. Base of spinous dorsal longer than soft dorsal. Fourth dorsal spine produced, longer than head, following spines decreasing in length gradually. First anal spine shorter than second and third, these being subequal, anal angulate. Colour: Pale yellowish white; a black band from origin of dorsal extending downward to eye, chin and muzzle; lips and triangular part in front of eyes white, interorbital space with a black band posteriorly; a broad black transverse band from 5th to 7th dorsal spine descending to base of pectoral to belly and extending from origin of ventral to vent and a less defined broad blackish band from posterior dorsal spines to posterior rays of anal. Lower margin of anal fin including spines black, rest of the fin pale yellowish. Base of pectoral black, rest of the fin yellowish. Caudal yellowish. Ventral black.

Local name: *Didanegi* (Minicoy).

Distribution: Mauritius, Seychelles, Laccadives and from Java to the Philippines, Ryukyu Islands, Samoa, Tahiti, Tuamotu and Hawaiian Islands.

313. *Megaprotodon strigangulus* (Gmelin)

Chaetodon strigangulus Gmelin, Syst. Nat., ed. 13, p. 1269, 1788.

Chaetodon trifascialis Smith, Fishes of Southern Africa, p. 506, pl. 102, fig. 605 b, 1949.

Megaprotodon strigangulus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 51, fig. 17, 1936. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 97/259).

Specimens studied: Agathi (1), 86 mm. Androth (1), 66 mm. Kiltan (2), 19 and 21 mm. Minicoy (10), 17 to 90 mm.

D. XIV, 16-17; A. IV, 15-16; P. 15; V. I, 5. Llat. 24-27; Ltr. 7-8+14-15.

Head 3.0-3.2 in standard length, 3.6-3.8 in total length. Depth of body 1.8-2.0 in standard length, 2.25-2.40 in total length. Eye 3.0-3.3 in head, 1.0-1.1 in snout and also in convex interorbital space. Teeth in jaws slender, brush-like. Lateral line convexly curved and ending below hind rays of dorsal. Dorsal spines gradually increasing in length to the last; third anal spine equal to or slightly longer than 2nd and 4th. Pectoral half length of snout shorter than head; ventral slightly longer than pectoral. Colour: Pale brownish above, sides pale yellowish, an elongated white spot anteriorly below lateral line and another on lateral line below posterior spines of dorsal and anterior rays of soft dorsal.

A black band from nape through eye to isthmus; body with 19-23 dark angulate lines along scale rows, the angle of the stripes directed forwards. Dorsal and anal yellowish, soft dorsal and anal with narrow pale edges and narrow intramarginal blackish line. Pectoral and ventral clear. Caudal blackish brown with narrow white hind edge, narrow submarginal blackish line and broad whitish cross band. Young specimens characterised by a broad crescent shaped black band from soft dorsal to soft anal, these fins posteriorly edged with white, caudal peduncle and caudal fin yellowish white with a black cross band in the middle.

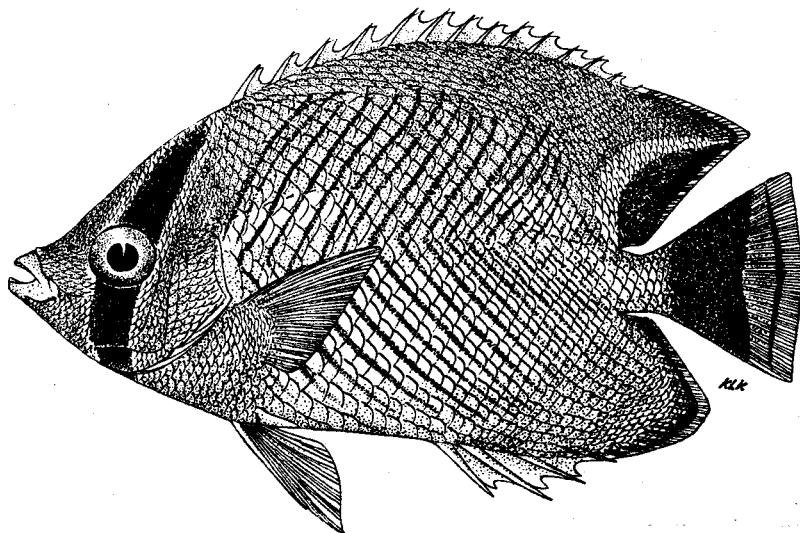


FIG. 313. *Megaprotodon strigangulus* (Gmelin), 86 mm.

Local names: *Handupholimas* (Minicoy). *Pakkikkadiya* (other islands).

Distribution: Widespread from the Red Sea and east coast of Africa to the Laccadives, Indonesia, Philippines and Ryukyu, Marianas, Marshall, Samoa, Society and Tuamotu Islands.

314. *Chaetodon meyeri* Bloch and Schneider

Chaetodon meyeri Bloch and Schneider, Syst. Ichth., p. 223, 1801. Smith and Smith, Fishes of Seychelles, p. 24, pl. 91, E, 1963. Jones and Kumaran. J. Mar. biol. Ass. India, 7, p. 122, fig. 18, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 97/260).

Chaetodon (Citharoedus) meyeri Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 69, fig. 20, 1936.

Specimens studied: Agathi (1), 98 mm. Bitra (2), 106 and 130 mm. Chetlat (2), 116 and 129 mm.

D. XII, 24; A. III, 20; P. 17; V. I, 5. Llat. 52; Ltr. 9+26.

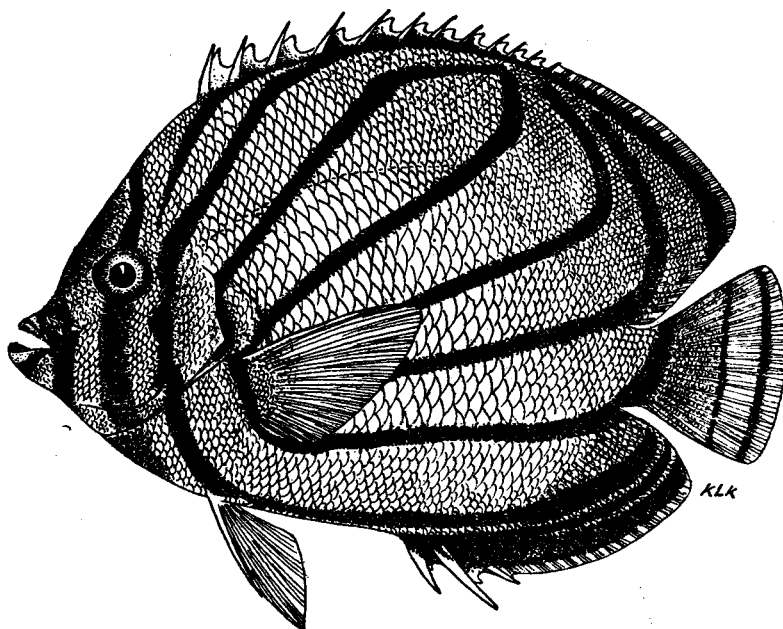


FIG. 314. *Chaetodon meyeri* Bloch and Schneider, 98 mm. (after Jones and Kumaran).

Head 3.0-3.2 in standard length, 3.65-3.80 in total length. Depth of body 1.4-1.5 in standard length, 1.7-1.8 in total length. Eye 3.7-3.8 in head, 1.3-1.4 in snout and about 1.2-1.3 in convex interorbital space. Lateral line convexly rounded till below last dorsal spine and then obliquely downwards and ending below posterior third of soft dorsal. Spinous dorsal gradually increasing in length, 6th or 7th spine longest, posterior spines slightly shorter. Second and third anal spines equal in length. Pectoral slightly shorter than head, ventral shorter than pectoral. Colour: Pearly white, upper sides of head pale greyish, a dark spot between ventrals and black stripes on head and body, one around the mouth, one from snout to lower edge of interopercle, one from nape through eye to cheek, one from second dorsal spine towards eye, one from below 4th and 5th dorsal spines continued as an intramarginal black band on dorsal across preopercle border and along base of ventral and passing posteriorly to base of anal, a stripe from pectoral base through upper edge of operculum to posterior dorsal spines, curving and descending to base of pectoral and side of body to caudal peduncle, a curved stripe from anterior half of soft dorsal towards pectoral and another originating from anterior dorsal rays curving backward to last dorsal rays and forward to base of pectoral. Soft anal with two black bands separated narrowly by white. Two black bands across caudal fin. Pectoral and ventral yellowish white.

Local name: *Pakkikkadiya* (other islands).

Distribution: East coast of Africa, Madagascar, Seychelles, Mauritius, Laccadives, Indonesia, Philippines, Marshall Islands and Bismarck Archipelago.

315. *Chaetodon lunula* (Lacépède)

Pomacentrus lunula Lacépède, Hist. Nat. Poissons, 4, pp. 507, 511 and 513, 1803.

Chaetodon lunula Day, Fishes of India, p. 108, 1878. Smith, Fishes of Southern Africa, p. 238, pl. 31, fig. 598, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 97/261).

Chaetodon (Chaetodontops) lunula, Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 83, 1936.

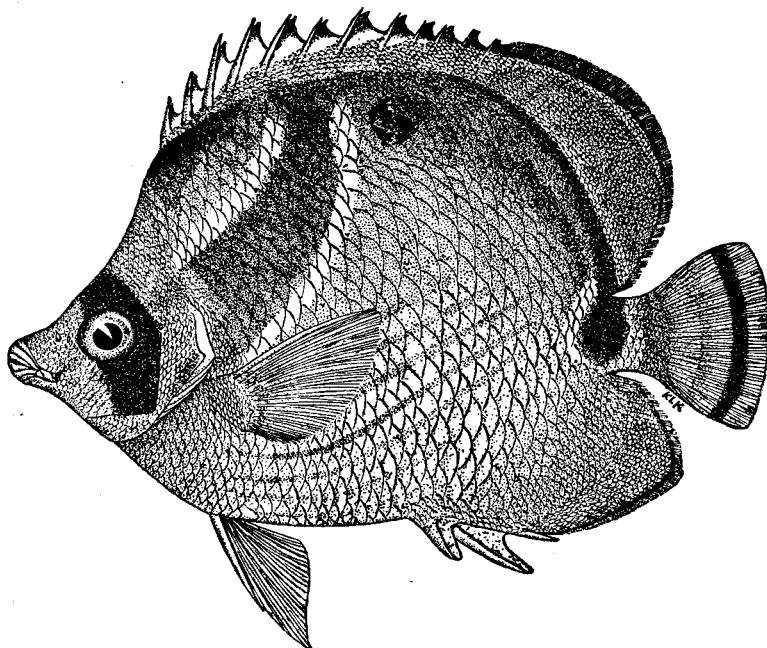


FIG. 315. *Chaetodon lunula* (Lacépède), 124 mm.

Specimens studied: Agathi (2), 27 and 51 mm. Ameni (2), 23 and 32 mm. Chetlat (2), 28 and 48 mm. Kavarathi (3), 38 to 50 mm. Kiltan (2), 57 and 58 mm. Minicoy (22), 16 to 124 mm.

D. XII, 23-25; A. III, 18-20; P. 16-17; V. I, 5. Llat. 36-40; Ltr. 7-8 + 16-17.

Head 2.7-3.1 in standard length, 3.3-3.8 in total length. Depth of body 1.4-1.6 in standard length, 1.7-1.9 in total length. Eye 3.1-3.4 in head, 1.1-1.2

in snout and equal to convex interorbital space. Dorsal profile of head concave. Lower border of eye below a level of gape of mouth. Dorsal spines increasing in length to the fourth or fifth, it being longest, other spines subequal. 2nd anal spine longer than third. Lateral line arched and ending below posterior part of soft dorsal. Pectoral $1/3$ length of snout shorter than head; ventral slightly shorter than pectoral. Colour: Brown above becoming yellowish white below; a dark brown cross band broader than eye and often edged with white from interorbital space across eye to edge of preoperculum, a large triangular black area from below base of 6th to 7th dorsal spine widening gradually and ending posterior to gill opening. A dark brown area below first four dorsal spines, a dark band from base of posterior dorsal spine, gradually broadening below end of soft dorsal and ending on caudal peduncle. Oblique dark bands running upwards and backwards on sides. Dorsal and anal light brownish with broad black marginal band. Caudal pale with submarginal blackish band and broad hyaline margin. Pectoral and ventral hyaline. Young specimens characterised by yellow edged black ocellus on soft dorsal, a black blotch at caudal peduncle and a black cross band anteriorly on caudal peduncle.

Local names: *Handupholimas* (Minicoy). *Pakkikkadiya* (other islands).

Distribution: Widely distributed from the east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Japan, Queensland and Mariana, Marshall, Marquesas and Hawaiian Islands.

316. *Chaetodon melanotus* Bloch and Schneider

- Chaetodon melanotus* Bloch and Schneider, Syst. Ichth., p. 224, 1801. Day, Fishes of India, p. 108, pl. 28, fig. 1, 1878. Smith, Fishes of Southern Africa, p. 237, pl. 31, fig. 596, 1949. Smith and Smith, Fishes of Seychelles, p. 24, pl. 19, E, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 97/262). *Chaetodontops melanotus* Munro, Fishes of Ceylon, p. 175, pl. 34, fig. 513, 1965. *Chaetodon (Chaetodontops) melanotus* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 87, 1936.

Specimens studied: Bitra (1), 86 mm. Minicoy (1), 45 mm.

D. XII, 20; A. III, 8; P. 15; V. I, 5. Llat. 36-38; Ltr. 6+14-15.

Head 2.7-3.1 in standard length, 3.2-3.7 in total length. Depth of body 1.55-1.70 in standard length, 1.9-2.0 in total length. Eye 3.0-3.1 in head, 0.9-1.0 in snout and also in convex interorbital space. Profile of snout somewhat concave. Lower border of eye somewhat above a level from the gape of mouth. Lateral line strongly ascending to below hind third of spinous dorsal and curving down and ending below posterior third of soft dorsal. Dorsal spines increasing in length to the fifth or sixth, it being longest, 2.2-2.3 eye diameter. Second anal spine longer than the third. Pectoral shorter than head, ventral equal to or slightly longer than pectoral. Colour: Upper part of body dark olivaceous,

sides of head and body yellowish, sides with narrow oblique dark lines along scale rows formed by spots on scales; base of first four anal rays and back dark brown; a dark brown band from front of dorsal fin through eye meeting the one from the other side on chest, forming a blotch and a dark brown cross band on caudal peduncle. Dorsal and anal brownish yellow with a narrow dark submarginal band for soft portions of the fins, outer portion whitish. Pectoral and ventral yellowish. Caudal yellowish basally, white distally, the two colours separated by a dark vertical band.

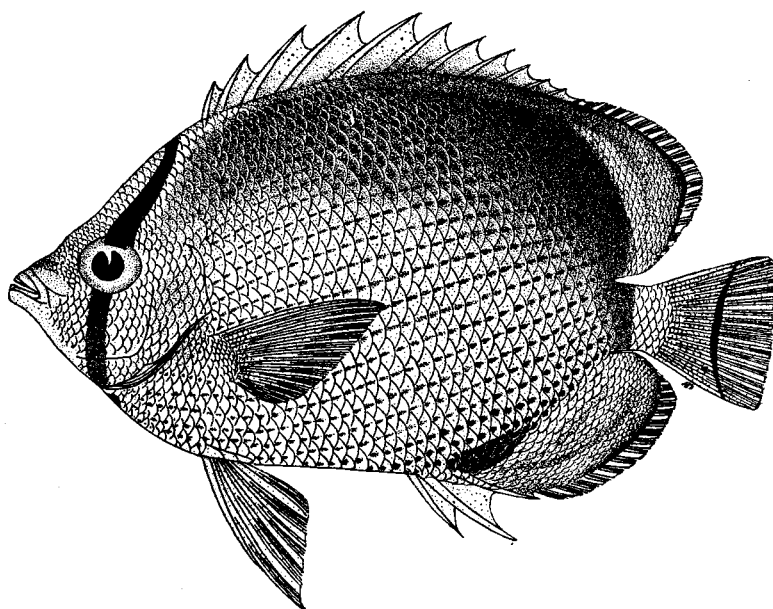


FIG. 316. *Chaetodon melanotus* Bloch and Schneider, 86 mm.

Local names: *Handupholimas* (Minicoy). *Pakkikkadiya* (Bitra).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China and Palau, Caroline, Fiji, Samoa and Tonga Islands.

317. *Chaetodon collaris* Bloch

Chaetodon collaris Bloch, Naturges. Ausland. Fische, 3, p. 116, 1787. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 97/263).

Chaetodon collaris Day, Fishes of India, p. 107, pl. 27, fig. 6, 1878.

Chaetodon (Chaetodontops) collaris Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 91, 1936.

Chaetodontops collaris Munro, Fishes of Ceylon, p. 174, pl. 34, fig. 512, 1955.

Specimen studied: Chetlat (1), 85 mm.

D. XII, 26; A. III, 22; P. 16; V. I, 5. Llat. 32; Ltr. 8+16.

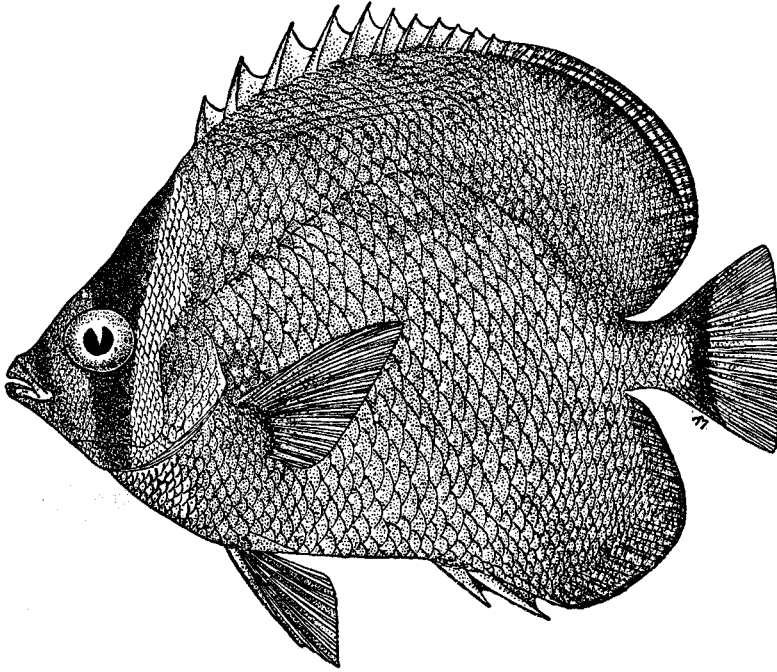


FIG. 317. *Chaetodon collare* Bloch, 85 mm.

Head 3 in standard length, 3.6 in total length. Depth of body 1.45 in standard length, 1.75 in total length. Eye 3 in head, equal to snout and also interorbital space. Gape of mouth slightly below a level from lower border of eye. Pectoral shorter than head; ventral slightly shorter than pectoral. Base of spinous dorsal about equal to base of soft dorsal. Fifth dorsal spine longest, posterior spines slightly shorter. Second anal spine stronger and slightly longer than the third. Lateral line running straight to below 9th or 10th dorsal spine and curving downwards posteriorly. Colour: Brownish olive, scales of body with pale centre. A dark brown band from before dorsal through eye to lower border of interopercle bordered behind with a broad white band and narrow white front border and a brown band on snout, chin whitish. Dorsal brownish, distal margin of soft dorsal white, edged with black, pale, dark and white intramarginal bands. Anal brownish edged with white, black and pale bands. Pectoral hyaline; ventral blackish. Caudal scarlet basally, a black cross band in the middle and broadly whitish distally.

Local name: *Pakkikkadiya* (Chetlat).

Distribution: Muscat and Madagascar in the Western Indian Ocean to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and as far as Marianas Islands.

318. *Chaetodon citrinellus* Cuvier

Chaetodon citrinellus Cuvier and Valenciennes, Hist. Nat. Poissons, 7, p. 27, 1831. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 121, fig. 17, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 17, 1969 (Cat. No. CMFRI-LA-F. 97/264).

Chaetodon (Tetragonopterus) citrinellus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 76, fig. 23, 1936.

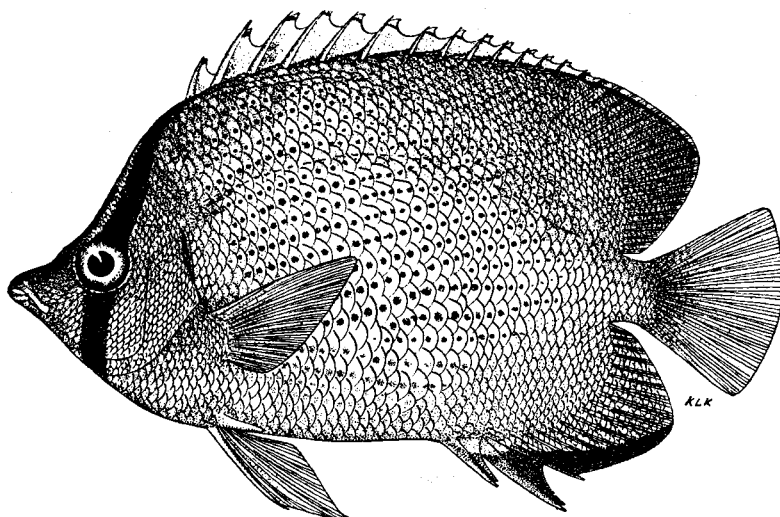


FIG. 318. *Chaetodon citrinellus* Cuvier, 81 mm. (after Jones and Kumaran)

Specimens studied: Chetlat (2), 24 and 25 mm. Kiltan (2), 27 and 81 mm. Minicoy (13), 35 to 75 mm.

D. XIII-XIV, 20-22; A. III, 16-17; P. 15; V. I, 5. Llat. 37-41; Ltr. 8+15-16.

Head 3.1-3.3 in standard length, 3.9-4.1 in total length. Depth of body 1.7-1.8 in standard length, 2.0-2.1 in total length. Eye 3.1-3.3 in head, about 1:2 in snout and about equal to convex interorbital space. Lateral line arched, terminating below end of dorsal. Dorsal spines increasing in length to the fourth or fifth, it being longest, posterior spines slightly shorter. Second anal spine stronger and longer than the third. Pectoral shorter than head, ventral equal to or slightly longer than pectoral. Colour: Yellowish, gradually becoming whitish below, upper sides of head and top of snout dark; scales on sides of body with bluish black spots, a broad dark brown band from first dorsal spine through eye to lower margin of interopercle. Dorsal yellowish white, tip of anterior spines dusky, posterior part of spinous dorsal and anterior 2/3 of soft dorsal

with narrow black submarginal line and narrow white outer border. Lower border of anal fin with broad black margin and submarginal yellowish band. Caudal, pectoral and ventral yellowish hyaline.

Local names: *Handupholimas*, *Sikkikokkamas* (Minicoy). *Pakkikkadiya* (other islands).

Distribution: Laccadives and from Indonesia to Ryukyu, Mariana, Marshall, Tuamotu and Hawaiian Islands and Australia.

319. *Chaetodon bennetti* Cuvier

Chaetodon Bennettii Cuvier and Valenciennes, Hist. Nat. Poissons, 7, p. 84, 1831.

Chaetodon bennetti Smith, Fishes of Southern Africa, p. 506, 1949. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 3, fig. 4, 1967. Jones Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 97/265).

Chaetodon (Rhabdophorus) bennetti Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 62, 1936.

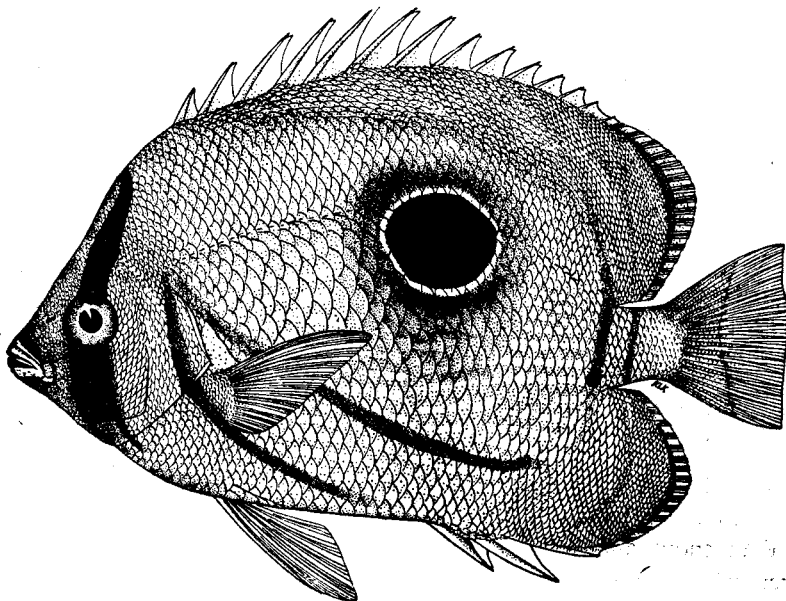


FIG. 319. *Chaetodon bennetti* Cuvier, 90 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (2), 88 and 90 mm.

D. XIV, 17-18; A. III, 16; P. 15-16; V. I, 5. Ll. 46-47. Ltr. 9+1+19.

Head 3.2 in standard length, 3.8 in total length. Depth of body 1.6 in standard length, 1.85-1.90 in total length. Eye 3.2 in head, equal to bluntly rounded snout and 1.0-1.1 in convex interorbital space. Rostro-dorsal profile

obliquely ascending, 7th to 9th dorsal spines longest, as long as head without snout. Spinous dorsal about twice longer than soft part. Second anal spine longer than third, as long as or slightly longer than 7th dorsal spine. Lateral line moderately arched, ending below posterior part of soft dorsal. Pectoral and ventral slightly shorter than head. Colour: Yellow with a large blackish blue blotch edged white below end of posterior dorsal spines; most of the blotch below the lateral line; a blackish blue band from front of dorsal through eye to isthmus; a similar band from operculum through base of pectoral towards anal origin and another from upper edge of gill opening to above middle of anal fin. Fins yellowish.

Local names: *Handupholimas*, *Kokkamas* (Minicoy).

Distribution: East coast of South Africa, Madagascar, Seychelles, Laccadives and from Indonesia to the Philippines and eastwards to Solomon, Gilbert, Samoan and Society Islands.

320. *Chaetodon trifasciatus* Mungo Park

Chaetodon trifasciatus Mungo Park, Trans. Linn. Soc. London, 3, p. 34, 1797. Smith, Fishes of Southern Africa, p. 237, pl. 31, fig. 593, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 97/266).

Chaetodon vittatus Day, Fishes of India, p. 107, pl. 27, fig. 5, 1878.

Chaetodon (*Rhabdophorus*) *trifasciatus* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 66, 1936. Balan, J. Bombay nat. H.st. Soc., 55, p. 301, 1958.

Rhabdophorus trifasciatus Munro, Fishes of Ceylon, p. 173, pl. 34, fig. 509, 1955.

Specimens studied: Agathi (1), 91 mm. Ameni (3), 85 to 100 mm. Chetlat (2), 101 and 102 mm. Kiltan (2), 82 and 88 mm. Minicoy (3), 23 to 32 mm.

D. XIII, 21-23; A. III, 19-20; P. 15; V. I, 5. Llat. 38-40; Ltr. 5-6 + 14-15.

Head 3.4-3.5 in standard length, 4.1-4.3 in total length. Depth of body 1.6-1.7 in standard length, 1.9-2.0 in total length. Eye 3.0-3.2 in head, slightly shorter than snout and equal to or slightly less than convex interorbital space. Preoperculum finely serrated. Dorsal spines increasing in length to 7th or 8th, these being longest, posterior spines slightly shorter. Second anal spine equal to or slightly longer than the third. Pectoral somewhat shorter than head; ventral shorter than pectoral. Lateral line somewhat convexly curved and ending below anterior third of soft dorsal. Colour: Pale brownish above, lighter below with 13-14 oblique dark lines on sides. Snout blackish, a black cross bar bordered by white from nape to isthmus and a narrow black band from below base of first 2 or 3 dorsal spines downward behind eye and to lower margin of preoperculum. Base of spinous dorsal with 6-7 narrow horizontal blackish lines. Soft dorsal with a broad black band basally bordered anteriorly by a broad yellowish band, a

narrow median dark band and a submarginal dark band, other margin clear. Anal fin yellowish white with a broad black band basally and a narrow submarginal dark band, distal margin pale. Caudal somewhat pale yellowish with a broad blackish band in the middle, distal margin clear. Pectoral and ventral pale.

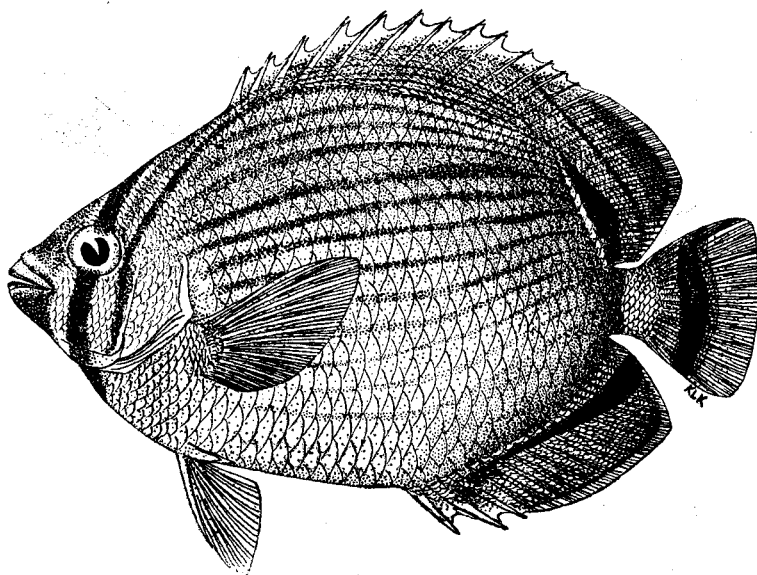


FIG. 320. *Chaetodon trifasciatus* Mungo Park, 102 mm.

Local names: *Handupholimas* (Minicoy). *Pakkikkadiya* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Ryukyu, Marianas, Marshall, Gilbert, Society, Tuamotu and Hawaiian Islands, south to Australia.

321. *Chaetodon xanthocephalus* Bennett

Chaetodon xanthocephalus Bennett, Proc. Zool. Soc., part 2, p. 182, 1832. Day, Fishes of India, p. 104, pl. 26, fig. 4, 1878. Smith, Fishes of Southern Africa, p. 239, pl. 32, fig. 605, 1949. Balan, J. Bombay nat. Hist. Soc., **55**, p. 301, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 97/267).

Rhabdophorus xanthocephalus Munro, Fishes of Ceylon, p. 174, pl. 34, fig. 510, 1955.

Specimens studied: Agathi (16), 139 to 158 mm. Bitra (1), 150 mm. Chetlat (2), 137 and 144 mm. Kiltan (2), 145 and 146 mm. Minicoy (8), 59 to 162 mm.

D. XIII-XIV, 24-27; A. III, 22-24; P. 16; V. I, 5. Llat. 38-42; Ltr. 9+19-21.

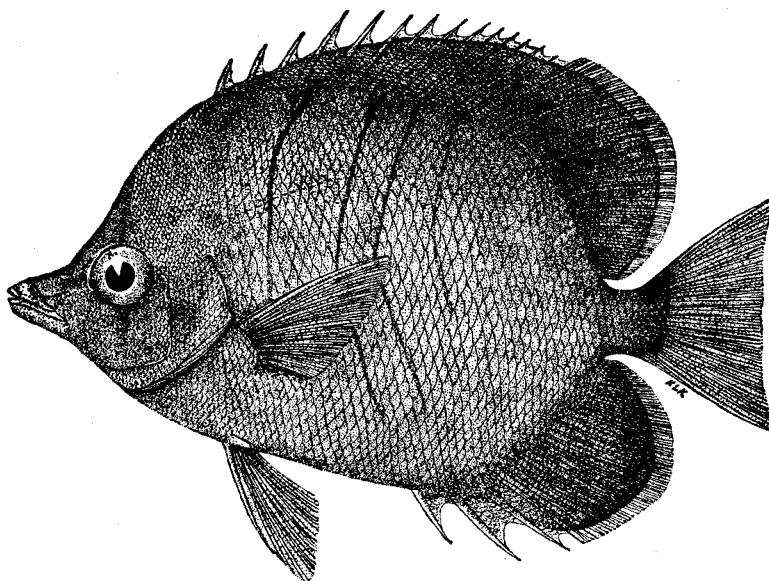


FIG. 321. *Chaetodon xanthocephalus* Bennett, 80 mm.

Head 2.8-3.3 in standard length, 3.5-4.0 in total length. Depth of body 1.6-1.7 in standard length, 1.85-2.00 in total length. Eye 3.7-4.6 in head, 1.4-1.8 in snout and 1.2-1.3 in highly convex interorbital space. Pectoral about 1/2 length of snout shorter than head; ventral slightly shorter than pectoral. Dorsal spines strong, increasing in length to the last. 3rd anal spine slightly longer than 2nd. Colour: Yellowish white with bluish tinge, 5-6 narrow dark subvertical streaks on sides, a dark band across eye disappearing with age and an indistinct dark area in front of eye. Dorsal and anal fins dark violet, more so posteriorly; bases yellowish, edges white. Caudal light bluish, blackish longitudinal streaks between median rays, upper and lower border yellowish, posterior margin white. Pectoral and ventral yellowish white.

Local names: *Handupholimas*, *Rhindukokka* (Minicoy). *Pakkikkadiya*, *Manhappakkikkadiya* (other islands).

Distribution: East coast of Africa, Zanzibar, Madagascar, Seychelles, Laccadives, coasts of India and Ceylon.

322. *Chaetodon falcula* Bloch

Chaetodon falcula Bloch, Naturges. Auslând. Fische, 7, p. 102, pl. 325, fig. 2, 1793. Day, Fishes of India, p. 104, pl. 26, fig. 5, 1878. Smith, Fishes of Southern Africa, p. 237, fig. 597, 1949. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 97/268). *Anisochaetodon* (*Oxychaetodon*) *falcula*, Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 116, 1936.

Specimens studied: Agathi (1), 118 mm. Bitra (1), 125 mm. Kavarathi (1), 127 mm. Minicoy (4), 131 to 150 mm.

D. XII, 25-26; A. III, 21-22; P. 15; V. I, 5. Llat. 27-30; Ltr. 5-6 + 13-14.

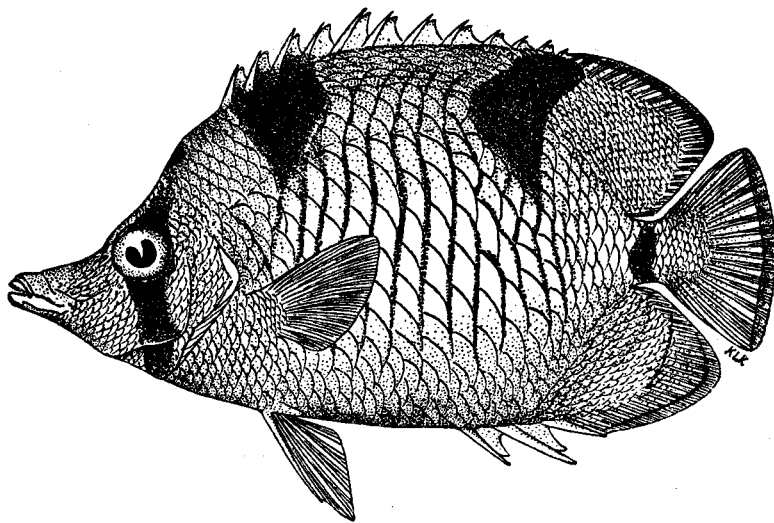


FIG. 322. *Chaetodon falcula* Bloch, 127 mm.

Head 2.8-2.9 in standard length, 3.3-3.4 in total length. Depth of body 1.6-1.8 in standard length, 1.9-2.2 in total length. Eye 3.8-4.0 in head, 1.7-1.9 in pointed snout and equal to slightly convex interorbital space. Gape of mouth somewhat below lower border of eye. Pectoral $\frac{2}{3}$ length of snout shorter than head. Ventral as long as pectoral. Lateral line arched, ending below end of soft dorsal. Spinous dorsal gradually increasing in length to the last, it being longest. Second and third anal spines almost equal in length. Colour: Yellow, slightly lighter below; a black cross bar from nape through eye to lower margin of interopercle, a black wide triangular band from tip of first four or five dorsal spines and another from last three dorsal spines and front dorsal rays to below lateral line; 12-14 vertical blackish lines on body. Caudal peduncle with a black ring sometimes incomplete above. Dorsal yellowish with a submarginal black line and white margin. Anal yellowish with submarginal black line, white margin and two diffuse dark median bands posteriorly. Caudal yellowish with a subterminal blackish band. Pectoral and ventral yellowish white.

Local names: *Handupholimas*, *Galikokkamas* (Minicoy). *Phakkikkadiya* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines and eastwards to Tuamotu Islands.

323. *Chaetodon auriga* Forskal

Chaetodon auriga Forskal, Descript. Animal., p. 60, 1775. Day, Fishes of India, p. 106, pl. 27, fig. 3, 1878. Smith, Fishes of Southern Africa, p. 237, pl. 31, fig. 592, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 97/269).

Anisochaetodon (Linophora) auriga Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 103, 1936. Balan, J. Bombay nat. Hist. Soc., 55, p. 301, 1958.

Linophora auriga Munro, Fishes of Ceylon, p. 175, pl. 34, fig. 515, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959.

Specimens studied: Agathi (5), 58 to 80 mm. Ameni (5), 62 to 127 mm. Androth (3), 75 to 88 mm. Bitra (1), 113 mm. Kavarathi (2), 67 and 127 mm. Kiltan (2), 116 and 129 mm. Minicoy (12), 29 to 126 mm.

D. XIII, 23-25; A. III, 20-21; P. 16; V. I, 5. Llat. 30-34; Ltr. 5-6 + 14-16.

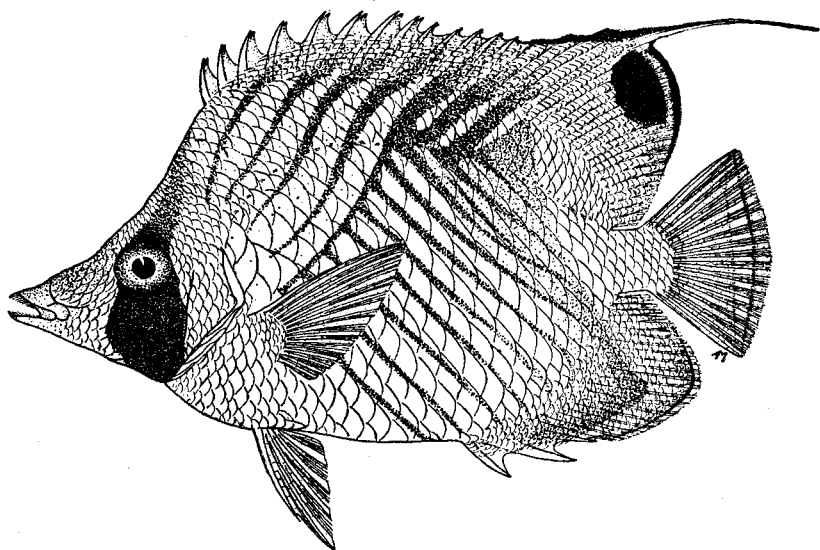


FIG. 323. *Chaetodon auriga* Forskal, 129 mm.

Head 2.8-3.1 in standard length, 3.4-3.7 in total length. Depth of body 1.5-1.7 in standard length, 1.8-2.1 in total length. Eye 3.4-4.0 in head, 1.3-1.7 in snout and equal to or slightly less than convex interorbital space. Gape of mouth below lower border of eye. Pectoral about half length of snout shorter than head; ventral slightly shorter than pectoral. Third anal spine equal to or slightly longer than 2nd spine. Dorsal spines gradually increasing in length, last spine longest, 5th and 6th dorsal rays filamentous. Lateral line strongly arched. Colour: Yellowish white, lighter to white below, upper part of head light grey-

ish; a dark brown band from nape, broadening below eye to lower margin of opercle. Anterodorsal part of body with 5-6 oblique dark stripes towards dorsal and 10-11 dark stripes posteroventrally. Dorsal yellow basally, whitish submarginal part and black margin and a black round or oval blotch between 5th or 6th and 11th or 12th dorsal rays. Anal yellow at base, white outer margin and a narrow submarginal black line. Caudal pale yellowish at base, white distally and two dark submarginal vertical stripes. Pectoral and ventral white.

Local names: *Handupholimas* (Minicoy). *Pakkikkadiya* (other islands).

Distribution: Tropical and temperate waters from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, China, Ryukyus and Australia and Marshall, Mariana, Samoa, Tahiti and Hawaiian Islands.

324. *Chaetodon vagabundus* Linnaeus

Chaetodon vagabundus Linnaeus, Syst. Nat., ed. 10, 1, p. 465, 1758. Day, Fishes of India, p. 105, pl. 27, fig. 1, 1878. Smith, Fishes of Southern Africa, p. 238, pl. 31, fig. 599, 1949. Smith and Smith, Fishes of Seychelles, p. 24, pl. 19, B, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 97/270).

Anisochaetodon (Linophora) vagabundus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 106, 1936.

Chaetodon pictus Day, Fishes of India, p. 105, pl. 26, fig. 6, 1878.

Linophora vagabunda Munro, Fishes of Ceylon, p. 176, pl. 34, fig. 517, 1955.

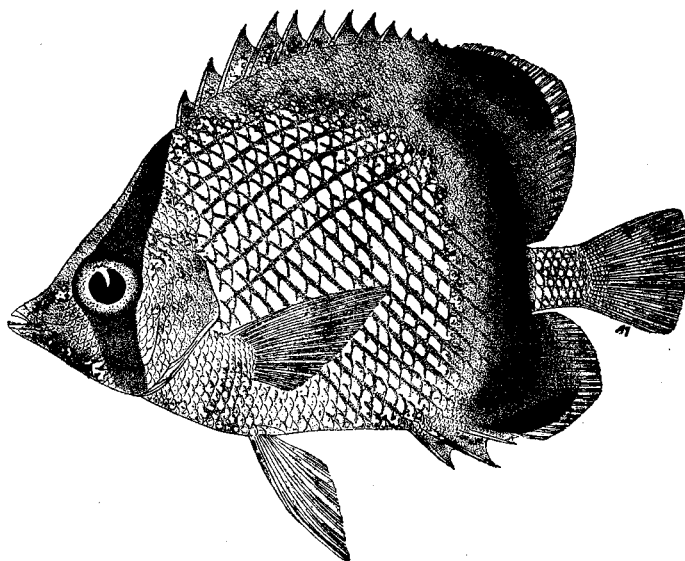


FIG. 324. *Chaetodon vagabundus* Linnaeus, 34 mm.

Specimen studied: Minicoy (1), 34 mm.

D. XIII, 25; A. III, 22; P. 16; V. I, 5. Llat. 31; Ltr. 6+16.

Head 2.7 in standard length, 3.2 in total length. Depth of body 1.7 in standard length, 2.0 in total length. Rostro-dorsal profile steeply ascending, snout slightly concave. Eye about 3 in head, 0.9 in snout and 0.8 in interorbital space. Gape of mouth slightly above a level of the lower border of eye. Lateral line strongly arched, ending below posterior rays of dorsal. Base of spinous dorsal longer than that of soft portion. Fourth of fifth dorsal spine longest, about 1.8 eye diameter. Pectoral and ventral half length of snout shorter than head. Colour: Yellowish with a black band edged white from front of dorsal through eye to interopercle, united with the one from the other side only on nape, six dark lines from behind upper part of opercle obliquely upwards towards dorsal and from the lowest of the above lines 11 dark lines directed downwards and backwards to anal and caudal peduncle. Dorsal and anal fins blackish especially posteriorly with clear outer margin for soft portions of both fins; the blackish colour extending on to the posterior part of body as a broad vertical band. Caudal yellowish. Pectoral yellowish; ventral pale.

Local name: *Handupholimas* (Minicoy).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan, Queensland and eastwards to New Hebrides, Solomon Islands, Bismarck Archipelago and Tahiti.

325. *Chaetodon kleini* Bloch

Chaetodon kleinii Bloch, Naturges. Ausländ. Fische, 4, p. 7, pl. 218, fig. 2, 1790. Day, Fishes of India, p. 106, 1878. Smith, Fishes of Southern Africa, p. 238, pl. 32, fig. 600, 1949.

Anisochaetodon (*Lepidochaetodon*) *kleini* Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 99, 1936.

Chaetodon kleini Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMF RI-LA-F. 97/271).

Specimen studied: Minicoy (1), 44 mm.

D. XIII, 22; A. III, 19; P. 15; V. I, 5. Llat. 31; Ltr. 7+13.

Head 2.9 in standard length, 3.5 in total length. Depth of body 1.6 in standard length, 1.9 in total length. Eye 2.9 in head, 0.8 in pointed snout and also in interorbital space. Rostro-dorsal profile steeply convex with slight concavity above eye. Lateral line arched upto below last spines of dorsal and then obliquely downward ending below hind dorsal rays. Base of spinous dorsal much longer than that of soft part, median dorsal spines as long as head without snout. Third anal spine slightly longer than the second spine. Colour: Yellowish, posterior part of body darker; a blackish band from nape through eye and meeting the one from the other side on chest and to base of ventrals; a light

brownish transverse band below anterior dorsal spines; scales of posterior part of body with a dusky spot, tip of snout dark. Dorsal and anal yellowish grey with narrow whitish edge and narrow intramarginal dark line. Caudal pale yellowish. Ventral brownish especially towards the tip.

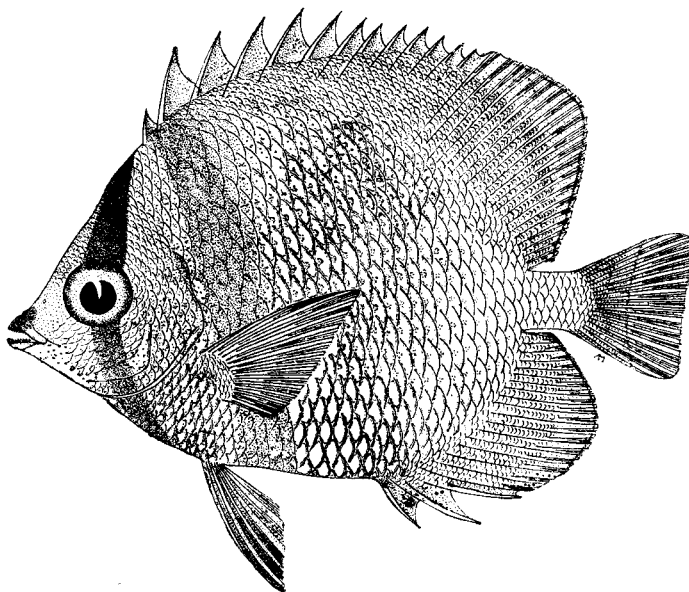


FIG. 325. *Chaetodon kleini* Bloch, 44 mm.

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, China, south to Australia and eastwards to Caroline, Marshall and Solomon Islands.

Family POMACANTHIDAE

Body strongly compressed, oblong oval. Mouth small, terminal. Teeth in jaws bristle-like, tricuspid; teeth present or absent on vomer. Preoperculum denticulate or strongly serrate, its angle with a strong spine. Interoperculum entire or serrated. Preorbital entire, serrate or spinous. Head and body covered with hard, adherent, ctenoid scales; scales extending on to the median fins and sometimes with auxiliary scales. Lateral line arched, complete and extending to caudal or incomplete and ending near end of caudal.

1. Lateral line terminating below dorsal. Scales large, 32-33 in lateral series. Hind margin of preorbital free, strongly dentate. Interorbital width equal to or less than eye. Blackish with several deep black transverse bands on sides; a black blotch below origin of lateral line and deep black band above base of anal *Centropyge multispinis*

Lateral line complete. Scales small, more than 70 in lateral series. Hind margin of preorbital not free. Interorbital width more than eye diameter 2

2. Llat. about 90. Purplish brown with a black cross bar from interorbital space to hind margin of operculum, a black area from chest to above pectoral and about 20 yellow stripes on sides of body

..... *Pomacanthodes imperator*

Llat. about 75. Anterior half of head and body upto anal origin greyish, posterior half brownish; sides of body with dark spots, soft dorsal, anal and caudal brownish with light spots .. *Pomacanthodes semicirculatus*

326. *Centropyge multispinis* (Playfair)

Holacanthus multispinis Playfair, Fishes of Zanzibar, p. 37, pl. 6, fig. 4, 1866.

Centropyge multispinis Munro, Fishes of Ceylon, p. 170, pl. 33, fig. 501, 1955. Smith, Ann. Mag. Nat. Hist., (12) 8, p. 378, pl. 5, A, 1955. Smith and Smith, Fishes of Seychelles, p. 24, pl. 18, I, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 133/272).

Specimens studied: Agathi (1), 88 mm. Ameni (1), 37 mm. Kavarathi (1), 45 mm. Minicoy (5), 69 to 90 mm.

D. XIV, 15-16; A. III, 16; P. ii, 14-15; V. I, 5. Ll. 32-33. Llat. 45-47; GR. 4+1+14-15.

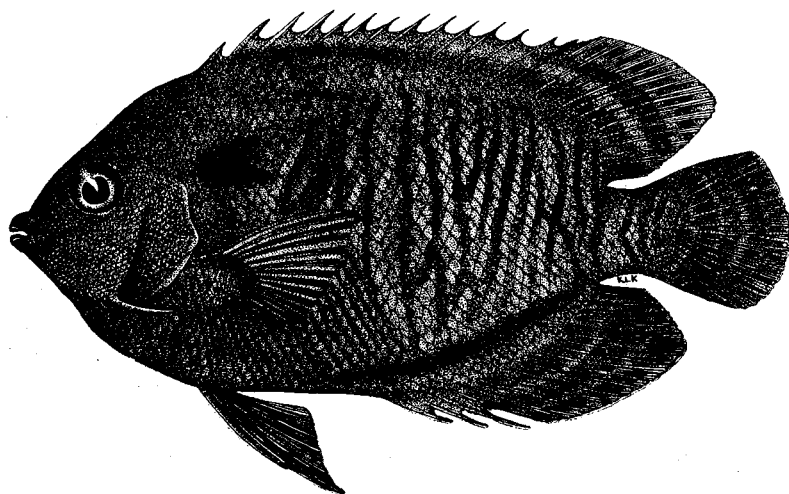


FIG. 326. *Centropyge multispinis* (Playfair), 83 mm.

Head 3.1-3.5 in standard length, 3.8-4.2 in total length. Depth of body 1.8-1.9 in standard length, 2.2-2.3 in total length. Eye 3.0-3.4 in head, 1.0-1.1 in snout and 0.9-1.1 in convex interorbital space. Preorbital strongly dentate posteriorly. Interoperculum less than eye diameter, with 2-3 small backwardly

directed spines. Preoperculum serrated, a long spine at angle and a smaller one below it. Lateral line terminating below end of spinous dorsal. Pectoral nearly equal to head. Ventral equal to pectoral or slightly longer. Colour: Blackish with several deep black transverse bands on sides. A black blotch below origin of lateral line and black band above base of anal. Dorsal blackish with 3 black bands. Anal similar with one or two black band basally. Pectoral blackish. Ventral and caudal black, the latter with narrow hind edge.

Local names: *Kalu* (Minicoy). *Karipadatham* (other islands).

Distribution: Zanzibar and Seychelles in the Western Indian Ocean, Laccadives and Ceylon in the Central Indian Ocean and New Hebrides in the Pacific.

327. *Pomacanthodes imperator* (Bloch)

Chaetodon imperator Bloch, Naturges. Ausl nd. Fische, 3, p. 51, pl. 194, 1787.

Holacanthus imperator Day, Fishes of India, p. 112, pl. 28, fig. 5, 1878. Smith, Fishes of Southern Africa, p. 235, pl. 30, fig. 585, 1949.

Holacanthus Nicobariensis Day, Fishes of India, p. 112, pl. 28, fig. 6, 1878.

Pomacanthodes imperator Munro, Fishes of Ceylon, p. 171, pl. 33, fig. 505 A and B, 1955. Smith and Smith, Fishes of Seychelles, p. 24, pl. 18, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 113/273).

Pomacanthus (Pomacanthodes) imperator Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 132, figs. 32 and 33, 1936.

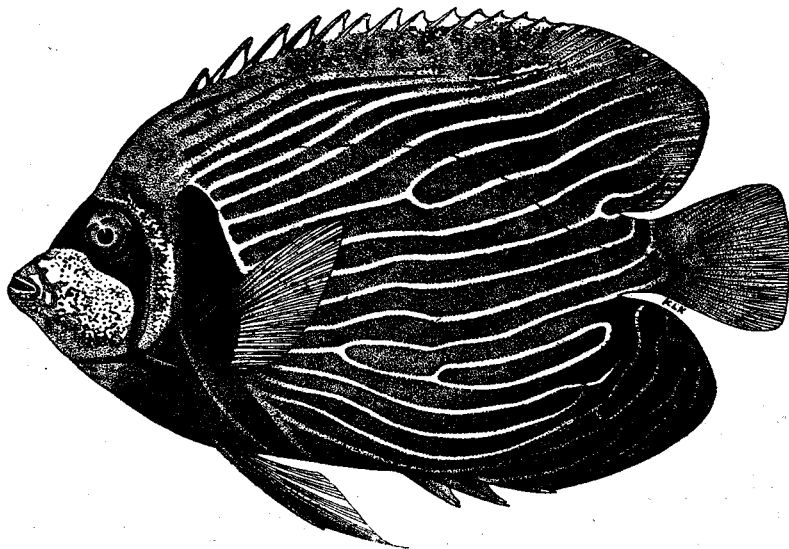


FIG. 327. *Pomacanthodes imperator* (Bloch), 192 mm.

Specimens studied: Minicoy (3), 42 to 192 mm.

D. XIV, 20-21; A. III, 19-21; P. ii, 16-17; V. I, 5.

Head 3.3-3.9 in standard length, 4.0-4.7 in total length. Depth of body 1.80-1.95 in standard length, 2.10-2.25 in total length. Eye 3.7-4.2 in head, 1.5-1.7 in snout and 1.1-1.3 in convex interorbital space. Preoperculum finely serrated, preopercular spine longer than diameter of eye. A few accessory scales on anterior part of body. Lateral line strongly arched. Dorsal spines increasing in length to the last, it being 1.5-1.6 in head, soft dorsal higher. Third anal spine longer than the other two. Pectoral slightly shorter than head. Ventral equal to or longer than head. Colour: Purplish brown; a black cross bar from interorbital space continued narrowly to hind border of preoperculum; a black area from chest to above pectoral extending to hind border of operculum; 18-24 yellow bands obliquely upwards and backwards from the black area extending on to dorsal, base of caudal and anal fin. General body colour extending on to dorsal but becoming yellowish distally; soft dorsal with a submarginal dark line. Anal dark violet with yellowish bands. Pectoral dark brown becoming pale distally. Ventral dark brown.

Local names: *Handupholimas*, *Harabalukokkamas* (Minicoy).

Distribution: Red Sea and east coast of Africa to Minicoy, coasts of India and Ceylon, Indonesia, Philippines, China, Japan, south to Queensland and east to Society and Tuamotu Islands.

328. *Pomacanthodes semicirculatus* (Cuvier)

Pomacanthus semicirculatus Cuvier and Valenciennes, Hist. Nat. Poissons, 7, p. 191, pl. 183, 1831.

Acanthochaetodon semicirculatus Bleeker, Atlas Ichth., 9, p. 69, pl. 370, fig. 5, 1877.

Pomacanthodes semicirculatus Smith, Fishes of Southern Africa, p. 235, pl. 30, fig. 584, 1949. Munro, Fishes of Ceylon, p. 171, pl. 33, fig. 504, A and B, 1955.

Pomacanthus (Pomacanthodes) semicirculatus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 141, figs. 36 and 37, 1936.

D. XIII, 21-23; A. III, 20-21; Llat. about 75.

Head 3.3-4.0, depth 1.5-1.7, both in standard length. Rostro-dorsal profile obliquely ascending with a slight concavity on snout. Eye above horizontal through gape of mouth, 3-4 in head, shorter than snout and about equal to interorbital space. Hind border of preopercle finely serrate, spine at angle of preoperculum about equal to eye diameter. Base of spinous part of dorsal longer than soft part. Dorsal spines increasing in length to the last, it being slightly longer than head without snout; soft dorsal acute with fifth to seventh rays somewhat produced. Third anal spine longest; soft fin acute with first two or three rays somewhat produced. Scales moderate, without axillaries. Colour: Anterior half of head and body upto anal origin yellowish, posterior part greyish brown; dark spots on sides of body; vertical fins brown with light spots on soft dorsal, anal and caudal.

Distribution: Widespread from the east coast of Africa and Red Sea to Seychelles, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Ryukyu Islands, Australia, Samoa, Fiji and Bismarck Archipelago.

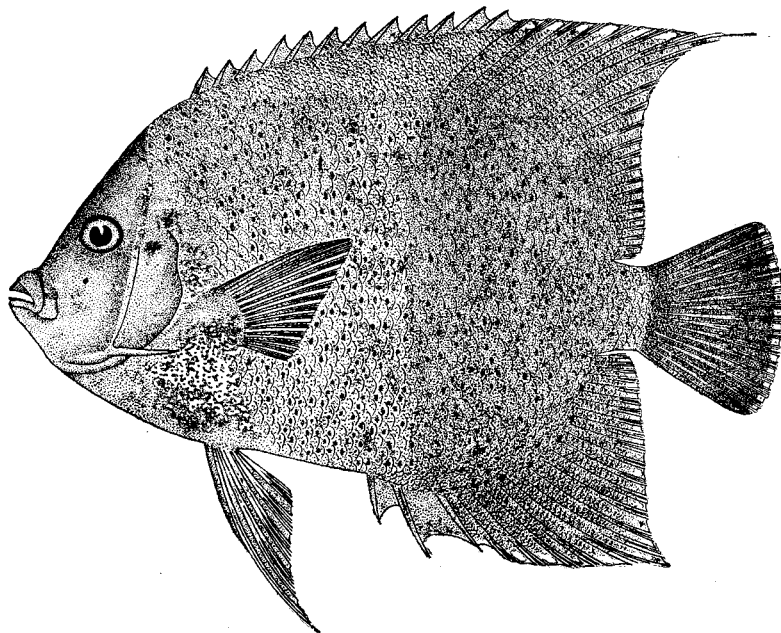


FIG. 328. *Pomacanthodes semicirculatus* (Cuvier). (after Bleeker)

Note: One specimen collected from Minicoy was lost subsequently.

Family CICHLIDAE

Body oblong, compressed. Teeth small, compressed, lobate and in one or more series in jaws. A single fairly long dorsal fin, the anterior part with numerous strong spines. Anal spines generally or sometimes equal or more than anal rays in number. Scales moderate or large, ctenoid. Lateral line complete.

329. *Sarotherodon mossambicus* (Peters)

Chromis mossambicus Peters, Monatsb. Akad. Wiss. Berlin, p. 681, 1852.

Tilapia mossambica Jones, Proc. Symposium on Scombroid Fishes, p. 665, fig. 33, (1962)
1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 68/274).

Specimens studied: Agathi (13), 58 to 120 mm. Kavarathi (8), 58 to 105 mm. Minicoy (28), 70 to 155 mm.

D. XV-XVI, 12; A. III, 10; P. ii, 13; V. I, 5. Ll. 30-31; Ltr. 4 + 1 + 14-15. GR. 16-19.

Head compressed, moderately elongate. Head 2.7-3.0 in standard length, 3.4-3.9 in total length. Depth of body 2.3-2.5 in standard length, 3.0-3.3 in total length. Eye 4.0-5.8 in head, 1.3-2.2 in snout and 1.3-1.7 in convex inter-orbital space. Teeth small, in several rows in jaws. Maxillary ending before a vertical from front edge of eye. First spine of dorsal equal to $2/3$ eye diameter, spines increasing gradually in length to the last, it being longest and slightly shorter than postorbital length of head. Third anal spine longest, 1.5-2.0 eye diameter. Pectoral as long as head. Ventral shorter than pectoral. Colour: Variable; silvery grey to greenish brown with 4-5 dark blotches or bars on sides. Dorsal part of operculum dark. Vertical fins variably brownish to blackish; dorsal with pale spots. Pectoral pale. Juveniles with a black blotch between first and fifth dorsal rays.

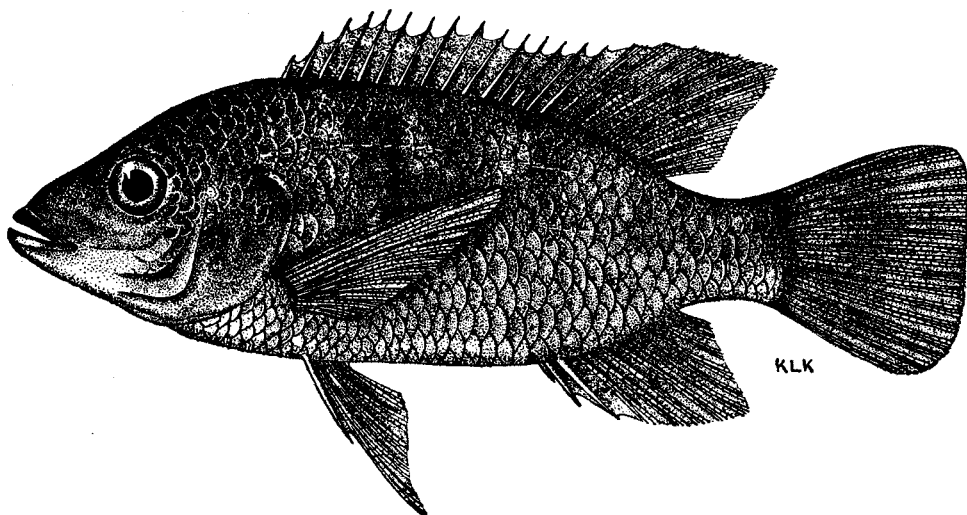


FIG. 329. *Sarotherodon mossambicus* (Peters), 90 mm.

Local names: *Mandapa* (Minicoy). *Kolathile-meen*, *Thilapia* (other islands).

Distribution: Indigenous to Africa and introduced in the fresh and brackish waters of tropical and subtropical parts of the world.

Note: This species was introduced about two decades ago at the instance of one of the authors (S. Jones) first in Minicoy and subsequently in the other islands to be used as an alternate live bait fish for tuna. It was found to thrive well in tanks and wells and is used sometimes as bait fish when there is scarcity for the usual bait fish around the islands. The local name *Mandapa* in Minicoy is derived from Mandapam in India from where it was first sent through Mr. M. Ali Manikfan, a member of the staff of the Central Marine Fisheries Research Institute. *Kolathile-meen* in Malayalam language in other islands means pond fish or tank fish.

Family POMACENTRIDAE

Body compressed, orbicular or oblong with large ctenoid scales. One or two rows of small, conical or compressed teeth in jaws. A single nostril on each side. Three and a half gills. Five to seven branchiostegals; pseudobranchiae present. Generally two anal spines. Lateral line interrupted, the anterior part of tubes and the posterior part on caudal peduncle when present consisting of pores only.

1. Scale rows more than 50. Ten dorsal spines. Opercle, subopercle and interopercle with strong serrations and radiating striae 2
Scale rows less than 40. Twelve or thirteen dorsal spines. Opercle, subopercle and interopercle smooth 4
2. Central part of caudal fin dark brown; outer edges of caudal fin edged with white. Ventral dusky *Amphiprion chrysogaster*
Caudal fin yellowish; no dark brown blotch on caudal 3
3. Dark brown with three whitish cross bars; the second bar narrower than the first, the third bar on caudal peduncle merging with the yellowish caudal fin. Ventral yellowish with dark anterior edge or completely black *Amphiprion bicinctus*
Yellowish, slightly violet on chest and abdomen; a pearly white cross bar from nape across hind margin of preopercle to posterior side of interopercle *Amphiprion nigripes*
4. Teeth in jaws conical or villiform 5
Teeth in jaws compressed, incisiform 15
5. Preopercle serrated 6
None of the opercles serrated 9
6. Scale rows more than 35. Body elongate, its greatest depth more than 2.5 *Lepidozygus tapeinosoma*
Scale rows about 30. Body ovate, its greatest depth less than 1.8 7
7. Brown to black; no cross bars. A white blotch in lateral line below seventh to ninth or tenth dorsal spines and often another on nape *Dascyllus trimaculatus*
Pale to brownish with two or three dark cross bars 8
8. Two faint cross bars. D. XII, 14-15 *Dascyllus reticulatus*
Three broad cross bars. D. XII, 12-13 *Dascyllus aruanus*
9. Second anal spine slightly longer than soft anal rays. D. XIII, 13-14 *Chromis chrysurus*
Second anal spine not longer than longest soft anal rays 10
10. Front teeth in lower jaw flaring outwards. A bluish to dark green band from snout to eye *Chromis caeruleus*
Front teeth in lower jaw not flaring outwards. No line from snout to eye 11

11. Thirteen dorsal spines 12
Twelve dorsal spines 13
12. An elongate dark blotch at upper edge of gill opening. Caudal uniform brownish. Depth 2.2-2.3 *Chromis opercularis*
A dusky stripe along upper edge of gill opening. Caudal lobes with dark stripe. Depth 2.3-2.5 *Chromis simulans*
13. Head and body upto level of first dorsal ray dark, hind half of body and caudal fin yellowish white *Chromis dimidiatus*
Body not divided into dark front part and light hind part 14
14. Depth of body about 2.0-2.2 *Chromis ternatensis*
Depth of body 2.4-2.6. Upper and lower edges of caudal dark brown *Chromis nigrurus*
15. Preopercular margin serrate; suborbital margin serrate or smooth 16
Preopercular margin smooth; suborbital margin always smooth 21
16. Twelve dorsal spines 17
Thirteen dorsal spines 19
17. Preorbital wide, its depth equal to eye in adults *Pomacentrus lividus*
Preorbital narrow, its depth not more than 2/3 eye in adults 18
18. Scales reaching to before nostrils but not to tip of snout. Preopercle margin narrowly naked *Pomacentrus nigricans*
Scales reaching to nostrils. Preopercle margin broadly naked *Pomacentrus albifasciatus*
19. Preorbital scaled. Preorbital and suborbital strongly spinate. A blackish spot just below origin of lateral line *Pomacentrus littoralis*
Preorbital naked 20
20. Depth 2.0-2.2. A black spot at origin of lateral line. Caudal abruptly lighter *Pomacentrus albicaudatus*
Depth 2.4-2.6. A bluish black blotch superiorly on hind border of opercle *Pomacentrus pavo*
Depth about 2. A black band along base of pectoral. Median fins dark except posterior part of anal; posterior ventral rays dark *Pomacentrus melanopterus*
21. 3-4 scales between lateral line and dorsal base 22
Generally 2 scales between lateral line and dorsal base 26
22. Scales on head reaching to or beyond nostrils 23
Scales on head not reaching to nostrils 25
23. Lower preopercular limb naked. Caudal lobes pointed. Transverse bands narrower than interspaces *Abudefduf bengalensis*
Lower preopercular limb scaly. Caudal lobes rounded 24

24. Scales on head reaching to beyond nostrils. Transverse bands narrower than interspaces; a dark band in each caudal lobe .. *Abudefduf sexfasciatus*
Scales on head not to beyond nostrils. Transverse bands not much narrower than interspaces. Caudal lobes without dark bands .. *Abudefduf saxatilis*
25. 15 dorsal rays. A black saddle on caudal peduncle .. *Abudefduf sordidus*
13 dorsal rays. No saddle on caudal peduncle .. *Abudefduf septemfasciatus*
26. Twelve dorsal spines 27
Thirteen dorsal spines 30
27. Hind border of preopercle rather jagged. A white cross band below sixth to eighth dorsal spines *Abudefduf cingulum*
Hind border of preopercle smooth 28
28. Four vertical bars on sides. A black spot at basal part of anterior dorsal rays *Abudefduf manikfani*
Colour not as above 29
29. Dark brown with bluish spots on head and upper part of body
..... *Abudefduf lacrymatus*
Brownish with black band from median rays of soft dorsal to hind rays of anal *Abudefduf dickii*
30. A few rudimentary scales on suborbital 31
Suborbital naked 32
31. A blue band from snout backwards above eye and base of dorsal and ending in a black blotch at bases of hind dorsal spines and anterior rays and another blotch at the bases of posterior dorsal rays
..... *Abudefduf biocellatus*
A black blotch at the bases of hind rays of soft dorsal
..... *Abudefduf uniocellatus*
Three or four yellowish transverse bands on sides. A dark blotch at the bases of hind dorsal rays *Abudefduf xanthozona*
32. A broad light transverse bar below fourth to seventh dorsal spines. Young with two ocelli on dorsal *Abudefduf zonatus*
Body without light transverse bar. Vent black *Abudefduf glaucus*

330. *Amphiprion chrysogaster* Cuvier

Amphiprion chrysogaster Cuvier and Valenciennes, Hist. Nat. Poissons, 5, p. 400, 1830.
Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 298, fig. 16, 1964.

Specimens studied: Minicoy (2), 36 and 38 mm.

D. X, 16; A. II, 13-14; P. ii, 17-18; V. I, 5. Ll. 40-41; Ltr. 6 + 1 + 20.

Head 3.1-3.2 in standard length, 4.1-4.2 in total length. Depth of body 2.0-2.1 in standard length, 2.5-2.6 in total length. Eye 2.4-2.5 in head, 0.6 in

snout and 0.9 in interorbital space. Teeth in a single series in either jaw. Preopercle finely serrate behind. Opercle, subopercle and interopercle strongly serrated. Pectoral shorter than head. Ventral slightly longer than head. Colour: Dark brown, snout and thorax yellowish white; three white transverse bars on head and body, the first from nape across opercle, the second from last two dorsal spines and first two or three anterior rays of soft dorsal to anus and origin of anal fin, the third on caudal peduncle. Dorsal dark brown except the last two dorsal spines and first two or three rays, these being white, anal pale to yellowish, ventral yellowish to dusky. Pectoral yellowish, base dark brown. Base, distal and outer edges of caudal white, central portion dusky brown.

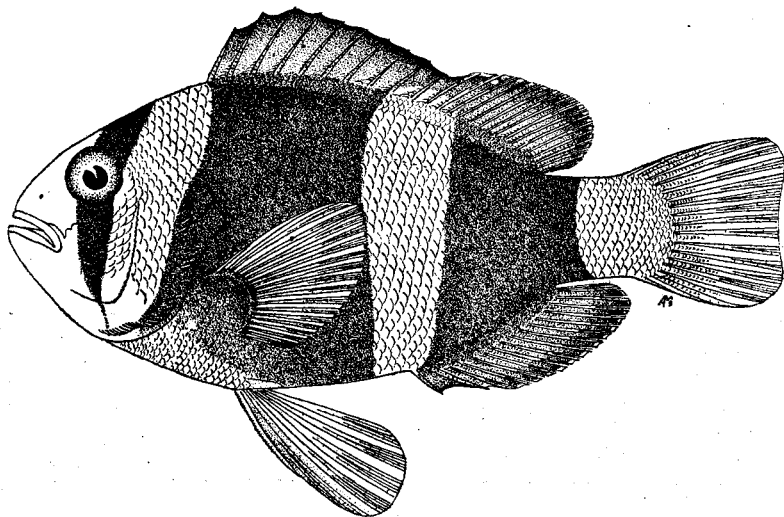


FIG. 330. *Amphiprion chrysogaster* Cuvier, 38 mm. (after Jones and Kumaran)

Local name: *Maugandumas* (Minicoy).

Distribution: East coast of South Africa, Mauritius, Laccadives, Indonesia to Ryukyu and Philippines and Marshall Islands.

331. *Amphiprion bicinctus* Rüppell

Amphiprion bicinctus Rüppell, Atlas Reise Nordl. Afrika, Fische, Rothen Meeres, p. 139, pl. 35, fig. 1, 1828. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 338, 1940. Munro, Fishes of Ceylon, p. 179, pl. 35, fig. 522, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 67/275).

Amphiprion clarkii Day, Fishes of India, p. 378, 1878.

Specimens studied: Minicoy (6), 25 to 61 mm.

D. X, 15-16; A. II, 13-14; P. ii, 17; V. I, 5. Ll. 36-39; Ltr. 6-7 +1 + 20-21.

Head 3.0-3.3 in standard length, 3.9-4.3 in total length. Depth of body 1.9-2.1 in standard length, 2.4-2.8 in total length. Eye 3.0-3.4 in head, 0.6-0.9 in snout and 1.0-1.2 in convex interorbital space. Teeth in a single series in jaws. Preopercle denticulated behind. Preorbital with 2 spines, suborbital, opercle, subopercle and interopercle strongly serrated. Scales on head reaching to a line from hind border of eye; about 20 predorsal scales. Third and fourth dorsal spines longest, about 1.5 eye diameter. Pectoral $1/3$ snout shorter than head. Ventral equal to head or slightly longer. Colour: Dark brown, snout and thorax pinkish. Three broad white bands, the first from nape to interopercle, the second from basal half of last two or three dorsal spines and one or two anterior rays to just in front of anal fin, the third on caudal peduncle and in continuation with the yellowish caudal fin. Dorsal dark brown to black, often with a narrow white edge to the soft part; anal pale to blackish; ventral yellowish with anterior dark edge or completely black; pectoral yellowish with dark brown base.

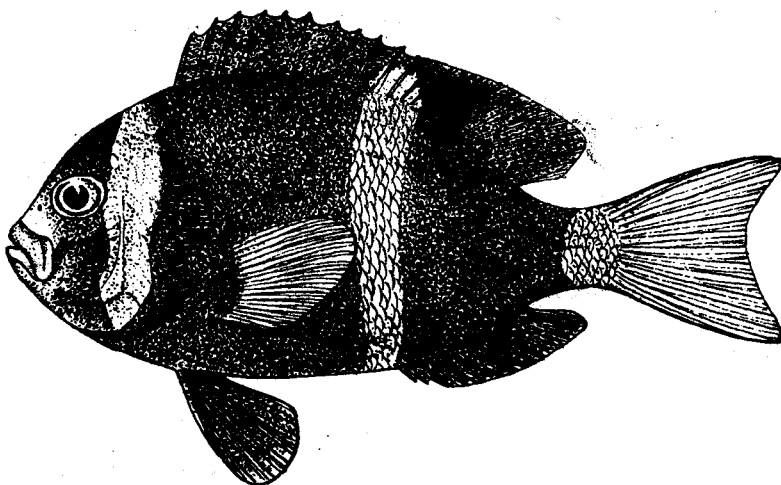


FIG. 331. *Amphiprion bicinctus* Rüppell, 56 mm.

Local name: *Maugandumas* (Minicoy).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China, Japan, Australia and Caroline, Solomon, Fiji, Samoan and Society Islands.

332. *Amphiprion nigripes* Regan

Amphiprion nigripes Regan, Trans. Linn. Soc. London, Zool., (2) 12, p. 230, pl. 24, fig. 2, 1908. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 67/276).

Specimens studied: Agathi (4), 21 to 47 mm. Chetlat (1), 39 mm. Kiltan (2), 73 and 76 mm. Minicoy (2), 55 and 70 mm.

D. X, 16-17 (18); A. II, 13-14; P. ii, 16-17; V. I, 5. Ll. 31-36; Ltr. 6-7+1+19-20. GR. 4-5+1+11-13.

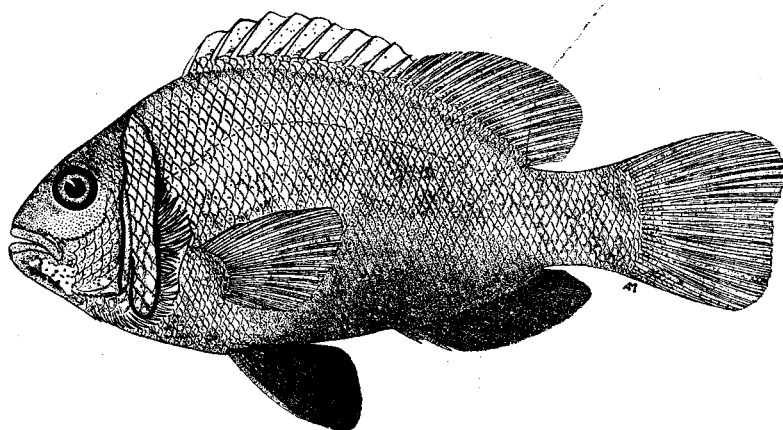


FIG. 332. *Amphiprion nigripes* Regan, 73 mm.

Head 3.1-3.3 in standard length, 3.9-4.3 in total length. Depth of body 2.1-2.4 in standard length, 2.7-3.1 in total length. Eye 3.3-3.8 in head, 0.7-0.9 in snout and 1.0-1.2 in convex interorbital space. Mouth oblique, maxillary reaching to below front border of eye. Teeth in a single series in jaws, those anteriorly compressed. 3rd, 4th and 5th dorsal spines subequal, as long as 1.3 diameter of eye. Pectoral fin about $1\frac{1}{2}$ length of snout shorter than head. Ventral slightly shorter than pectoral. Caudal subtruncate. Preopercle with 4-5 rows of scales. 54 to 58 scales in a longitudinal series. Preorbital with 2 spines, suborbital with 12-15 serrations, preopercle border coarsely denticulate; opercle, subopercle and posterior part of interopercle with radiating striae and strong serrations. Colour: Yellow; lower sides of chest and abdomen somewhat violet in large specimens; a pearly white transverse band, a little less than an eye diameter in breadth narrowly edged with violet running from nape ventrally across hind margin of preopercle and anterior part of opercle to posterior side of interopercle. Dorsal, caudal and pectoral yellow; ventral and anal blackish.

Local names: *Maugandumas* (Minicoy). *Pushpachala* (other islands).

Distribution: Known only from Maldives and Laccadives.

333. *Lepidozygus tapeinosoma* (Bleeker)

Pomacentrus tapeinosoma Bleeker, Nat. Tijds. Ned.-Ind., 10, p. 376, 1856.

Lepidozygus anthioides Smith, Ann. Mag. Nat. Hist., (12), 8, p. 886, pl. 20, fig. C, 1955.
Smith, Ichth. Bull., 19, p. 321, pl. 31, K, 1960.

Lepidozygus tapeinosoma de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 471, 1940. Jones, Proc. Symposium on Scombroid Fishes, p. 669, fig. 39, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 67/277).

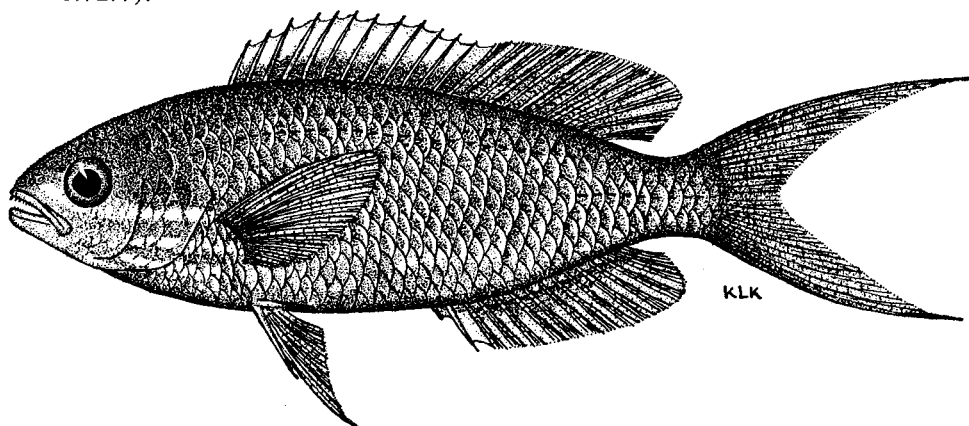


FIG. 333. *Lepidozygus tapeinosoma* (Bleeker), 58 mm.

Specimens studied: Minicoy (370), 28 to 70 mm.

D. XII, 14-15; A. II, 14-16; P. ii, 19-20; V. I, 5. Ll. 18-20 + 13-16; Ltr. 3+1+9-10.

Head 3.2-3.8 in standard length, 4.5-5.4 in total length. Depth of body 2.8-3.2 in standard length. 3.6-4.2 in total length. Eye 3.4-4.0 in head, 0.6-0.9 in snout and 1.0-1.2 in convex interorbital space. Hind margin of preopercle finely serrated. 17-18 gill rakers on lower limb of first gill arch. A single series of somewhat conical teeth in jaws. Caudal deeply forked, the lobes somewhat filamentous. Pectoral slightly shorter than head. Ventral with the first ray produced, equal to or slightly shorter than head. Colour: Olive to purplish on back becoming somewhat reddish on the lower sides of head, chest and abdomen. Dorsal bluish brown with orange coloured oblique stripes and hind 2-3 rays orange. Anal bluish brown with horizontal orange coloured stripes. Pectoral and ventral pinkish. Caudal lobes brownish, hind part of the fin orange. Upper part of head with pale spots. In another colour variety, the dorsal fin is completely bluish brown with orange oblique stripes and the caudal is brownish, the hind part of the fork only slightly lighter. The hind rays of dorsal and inside the fork of caudal are not orange coloured as in the other variety. Both forms are abundant in bait fish collections.

Local names: *Bureki*, *Maujahibureki* (Minicoy).

Distribution: Aldabra, Seychelles, Laccadives, Indonesia and Philippines.

Note: This is reported to be the most important live tuna-bait in Minicoy island. It occurs in large shoals though there may be abrupt set-backs in their occurrence during certain months. It is ideal for use as bait fish owing to its high rate of survival in the bait well. A very active and hardy fish and is very effective in chumming tunas.

334. *Dascyllus trimaculatus* (Rüppell)

Pomacentrus trimaculatus Rüppell, Atlas Reise Nordl. Afrika, Fische, Rothen Meeres, p. 39, pl. 8, fig. 3, 1828.

Dascyllus axillaris Smith, Fishes of Southern Africa, p. 290, 1949.

Dascyllus trimaculatus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 463, fig. 53, 1940. Smith, Fishes of Southern Africa, p. 280, pl. 50, fig. 751, 1949. Munro, Fishes of Ceylon, p. 180, pl. 35, fig. 527, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 67/278).

Tetradrachmum trimaculatum Day, Fishes of India, Suppl., p. 801, 1888.

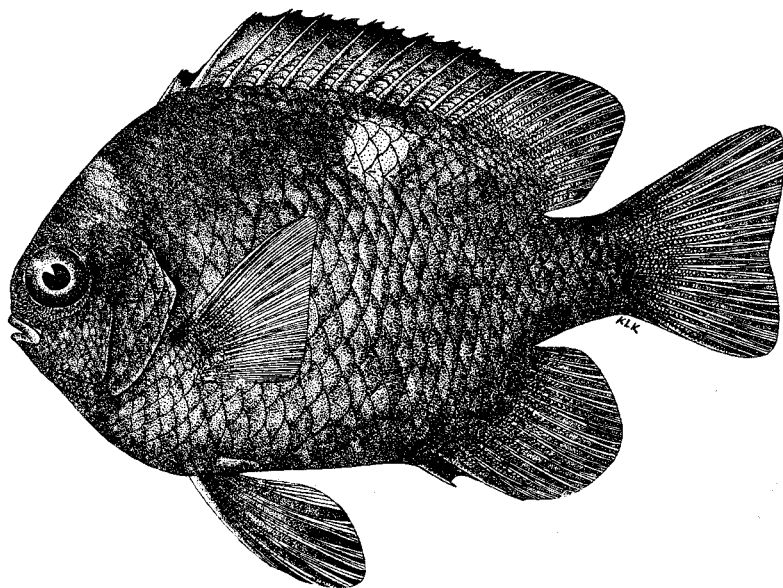


FIG. 334. *Dascyllus trimaculatus* (Rüppell), 78 mm.

Specimens studied: Agathi (17), 22 to 75 mm. Bitra (6), 22 to 48 mm. Kadamat (6), 22 to 43 mm. Minicoy (43), 13 to 103 mm. Suheli (1), 22 mm. D. XII, 14-15; A. II, 14; P. ii, 17-18; V. I, 5. Ll. 17-19 +8; Ltr. 4+1+10-11.

Head 3.2-3.5 in standard length, 4.2-4.5 in total length. Depth of body 1.5-1.7 in standard length, 2.0-2.3 in total length. Eye 2.5-2.8 in head, 0.4-0.5 in snout and equal to convex interorbital space. Teeth in several rows in jaws, outer row slightly enlarged. Pectoral longer than head. Ventral equal to or slightly longer than pectoral. Caudal slightly emarginate, the upper lobe longer than the lower. Hind border and lower border of preopercle denticulated. Colour: Dark reddish brown to brownish black in large specimens. Scales of body

with dark hind border. Young with a white blotch on nape and another in lateral line below 7th to 9th or 10th dorsal spines. These two blotches gradually disappear with growth. Dorsal and anal dark brown distally, light brown basally. Caudal and ventral dark. Pectoral pale to dusky with dusky brown blotch at the upper edge of base.

Local names: *Kaluburang* (Minicoy). *Karipadatham*, *Barakkotti* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Marshall, Society and Hawaiian Islands and Australia.

335. *Dascyllus reticulatus* (Richardson)

Heliases reticulatus Richardson, Rep. British Assoc. Adv. Sci., p. 254, 1846.

Dascyllus carneus Smith, Fishes of Southern Africa, p. 280, pl. 58, fig. 750, 1949.

Dascyllus marginatus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 465, fig. 54, 1940 (in part). Smith, Fishes of Southern Africa, p. 280, fig. 753, 1949 (not of Rüppell). Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959 (not of Rüppell).

Dascyllus reticulatus Smith, Ichth. Bull., 19, p. 327, pl. 31, J, 1960. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 67/279).

Tetradrachmum marginatum Day, Fishes of India, p. 381, pl. 79, fig. 7, 1878 (in part).

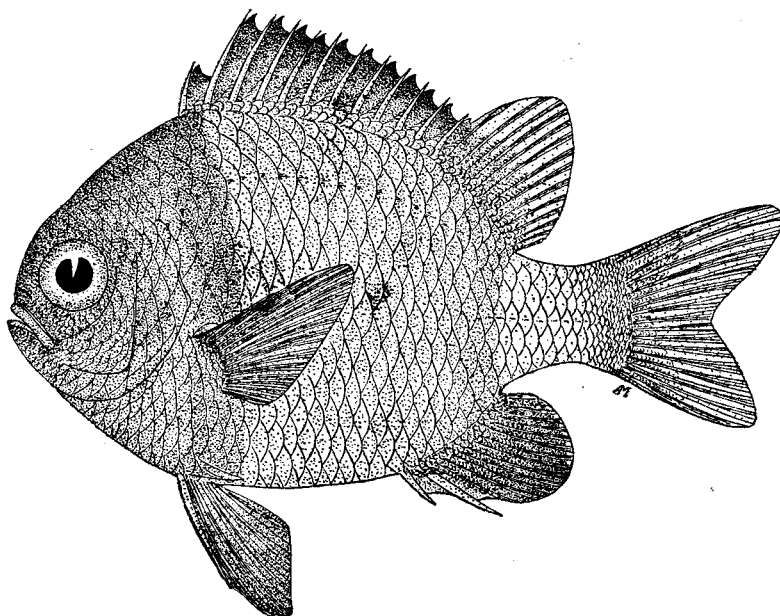


FIG. 335. *Dascyllus reticulatus* (Richardson), 32 mm.

Specimens studied.: Kadamat (8), 20 to 30 mm. Minicoy (53), 17 to 38 mm.

D. XII, 14-15; A. II, 13-14; P. ii, 17-18; V. I, 5. Ll. 18-19+8; Ltr. 3+1+11.

Head 3.0-3.2 in standard length, 3.9-4.2 in total length. Depth of body 1.6-1.7 in standard length, 2.0-2.1 in total length. Eye 2.5-2.7 in head, 0.5 in snout and about equal to interorbital space. Teeth in jaws somewhat conical, outer row enlarged. Pectoral and ventral subequal, equal to or slightly longer than head. Caudal slightly forked. Preopercle denticulated. Colour: Pale brownish with dark border to scales. Head dark brown. Scales on head, chest and upper part of body upto the level of second or third dorsal spine dark. A dark transverse band in young from anterior spines of dorsal through base of pectoral to base of ventral and another less distinct band from soft dorsal to soft anal. The posterior band disappearing and the anterior becoming paler with growth. Spinous dorsal, anal and ventral dark brown. Soft dorsal rays yellowish brown, caudal peduncle and caudal pale yellowish. In some, the distal margin of posterior rays of anal light. Pectoral hyaline with a black blotch at axil.

Local names: *Galiburang* (Minicoy). *Kallikkotti* (Kadamat).

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, China, Australia and Fiji and Hawaiian islands.

336. *Dascyllus aruanus* (Linnaeus)

Chaetodon aruanus Linnaeus, Syst. Nat., ed. 10, l.p. 275, 1758.

Dascyllus aruanus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 467, 1940.

Smith, Fishes of Southern Africa, p. 280, pl. 50, fig. 749, 1949. Munro, Fishes of

Ceylon, p. 180, pl. 35, fig. 528, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47,

1959. Jones, Proc. Symposium on Scombroid Fishes, p. 668, fig. 38, 1962. Jones,

Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 67/280).

Tetradrachmum aruanum Day, Fishes of India, p. 381, pl. 80, fig. 6, 1878.

Specimens studied: Agathi (20), 15 to 68 mm. Ameni (23), 25 to 59 mm. Androth (5), 32 to 45 mm. Bangaram (15), 18 to 63 mm. Chetlat (17), 25 to 55 mm. Kadamat (9), 24 to 48 mm. Kalpeni (12), 13 to 58 mm. Kavarathi (20), 18 to 54 mm. Kiltan (1), 38 mm. Minicoy (42), 10 to 65 mm. Suheli (17), 28 to 42 mm.

D. XII, 12-13; A. II, 12-13; P. ii, 15-16; V. I, 5. Ll. 17-18+8-9; Ltr. 3+1+9.

Head 3.0-3.5 in standard length, 3.8-4.3 in total length. Depth of body 1.6-1.8 in standard length, 2.1-2.3 in total length. Eye 2.7-3.0 in head, 0.6-0.7 in snout and 1.0-1.1 in convex interorbital space. Teeth in jaws conical, outer

row enlarged. Pectoral slightly shorter than head. Hind border and lower border of preopercle denticulated. Ventral equal to or longer than head. Colour: Pale white to brownish with three broad dark brown cross bands; the first band from chin obliquely upwards to the origin of first two dorsal spines, the second from the base of 5th or 6th to 9th dorsal spines obliquely to the base of pectoral and ventral and the third from soft dorsal to anal. Dorsal and anal brown, the distal part of the posterior rays light. Caudal dusky. Ventral dark. Pectoral light with dark base.

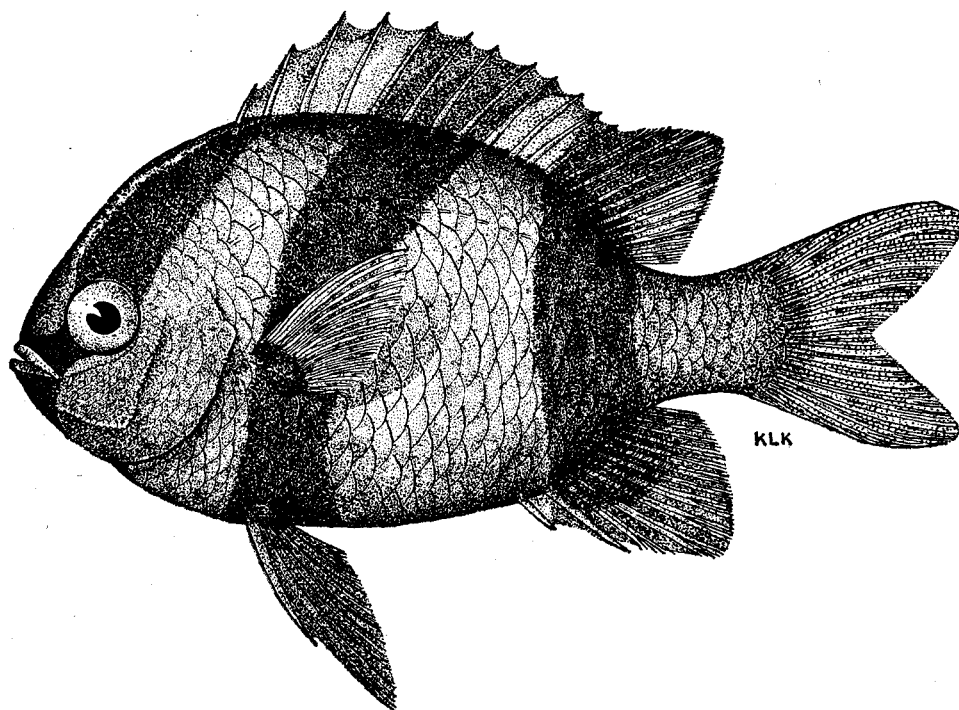


FIG. 336. *Dascyllus aruanus* (Linnaeus), 52 mm.

Local names: *Galiburang* (Minicoy). *Kallikkotti* (other islands).

Distribution: Coast of Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and China and Marshall, Samoan, Society and Marquesas Islands.

337. *Chromis chrysurus* (Bliss)

Heliastes chrysurus Bliss, Trans. Roy. Soc. Maur., 13, p. 56, 1883.

Chromis chrysurus Smith, Ichth. Bull., 19, p. 323, 1960. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 298, fig. 17, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 67/281).

Specimens studied: Kavarathi (2), 55 and 67 mm. Minicoy (1), 53 mm. D. XIII, 13; A. II, 13; P. ii, 16; V. I, 5. Ll. 18-19 +9; Ltr. 3+1+11.

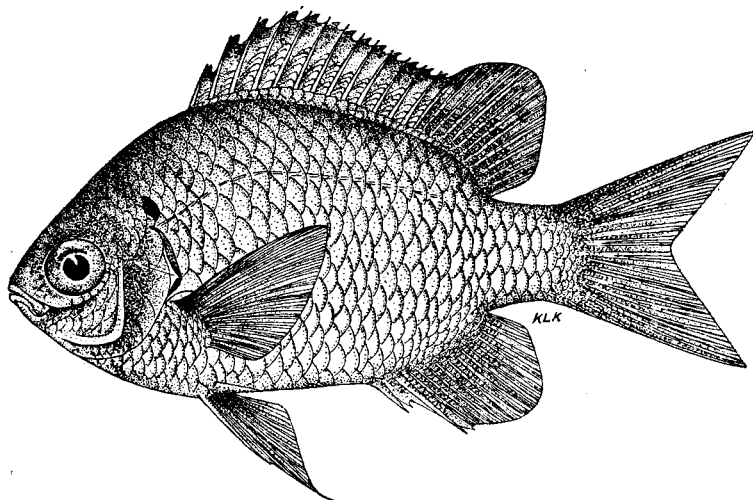


FIG. 337. *Chromis chrysurus* (Bliss), 67 mm. (after Jones and Kumaran)

Head 3.2-3.3 in standard length, 4.2-4.3 in total length. Depth of body 1.8 in standard length, 2.4-2.5 in total length. Eye 2.8-2.9 in head, 0.7-0.8 in snout and equal to interorbital space. Scales on head reaching to between nostrils. Second anal spine longer than longest dorsal spine. Three rows of scales on preopercle, the lower and posterior border naked. None of the opercles serrated. Pectoral slightly shorter than head, ventral equals head. Colour: Uniform bluish brown above, lighter below. Scales of body with dark margin. The scale above the origin of lateral line blackish. A blackish transverse bar at the posterior border of operculum. Spinous dorsal light brown, edged darker. Soft dorsal and anal pale brownish, posterior rays slightly lighter. Caudal pale. Anterior rays of ventral dusky, pale posteriorly. Pectoral pale yellowish with a black spot at the base of upper rays.

Local names: *Nilamahi* (Minicoy). *Padatham* (Kavarathi).

Distribution: Recorded only from Mauritius and Laccadives.

338. *Chromis caeruleus* (Cuvier)

Heliastes caeruleus Cuvier and Valenciennes, Hist. Nat. Poissons, 5, p. 497, 1830.

Chromis caeruleus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 451, fig. 52, 1940. Munro, Fishes of Ceylon, p. 180, pl. 35, fig. 526, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Smith, Ichth. Bull., 19, p. 323, pl. 28, D, 1960. Jones, Proc. Symposium on Scombroid Fishes, p. 667, fig. 35, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 18, 1969 (Cat. No. CMFRI-LA-F. 67/282).

Heliastes lepidurus Day, Fishes of India, p. 389, pl. 82, fig. 1, 1878.

Specimens studied: Agathi (8), 53 to 60 mm. Ameni (12), 34 to 57 mm. Androth (4), 40 to 53 mm. Bangaram (23), 28 to 59 mm. Chetlat (11), 22 to 64 mm. Kadamat (7), 48 to 57 mm. Kalpeni (7), 45 to 65 mm. Kalpitti (1), 42 mm. Kavarathi (8), 42 to 58 mm. Minicoy (58), 22 to 78 mm. Suheli (15), 27 to 50 mm.

D. XII, 10; A. II, 10 (11); P. ii, 15-16; V. I, 5. Ll. 15-17+8-10; Ltr. 2+1+8.

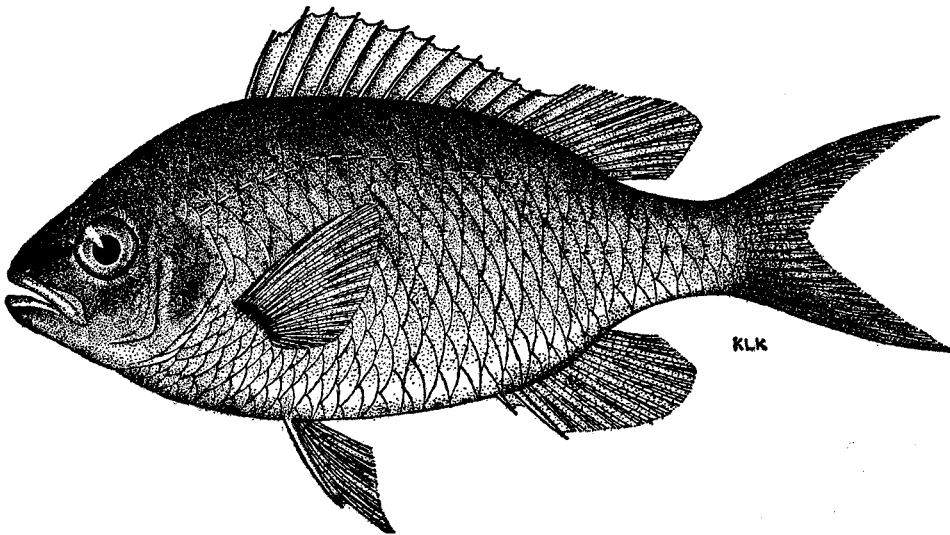


FIG. 338. *Chromis caeruleus* (Cuvier), 50 mm.

Head 3.0-3.4 in standard length, 4.0-4.4 in total length. Depth of body 2.0-2.3 in standard length, 2.7-3.0 in total length. Eye 3.0-3.3 in head, 0.7-1.0 in snout and equal to or slightly less than convex interorbital space. Teeth in jaws somewhat conical, those in front of lower jaw flaring outwards. Pectoral half length of snout shorter than head. Ventrals equal to or somewhat longer than pectorals. Caudal lobes pointed. None of the opercular bones serrated. Colour: Bluish green becoming lighter on sides and belly. Scales of body with a white spot. A dark green to bluish line from snout to eye. Caudal pale, the lobes greenish brown. Spinous dorsal light bluish green with dark edges. Soft dorsal, anal and ventral pale to greenish. Pectoral pale hyaline with the upper edge of base dusky.

Local names: *Nilamahi* (Minicoy). *Pachakkotti* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Indonesia to the Philippines and Caroline, Solomon, Gilbert and Tuamotu Islands and Australia.

339. *Chromis opercularis* (Günther)

Heliastes opercularis Günther, Fishes of Zanzibar, p. 84, pl. 4, fig. 2, 1866.

Chromis opercularis Smith, Ichth. Bull., 19, p. 325, pl. 26, K and pl. 32, G, 1960. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 300, fig. 19, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/283).

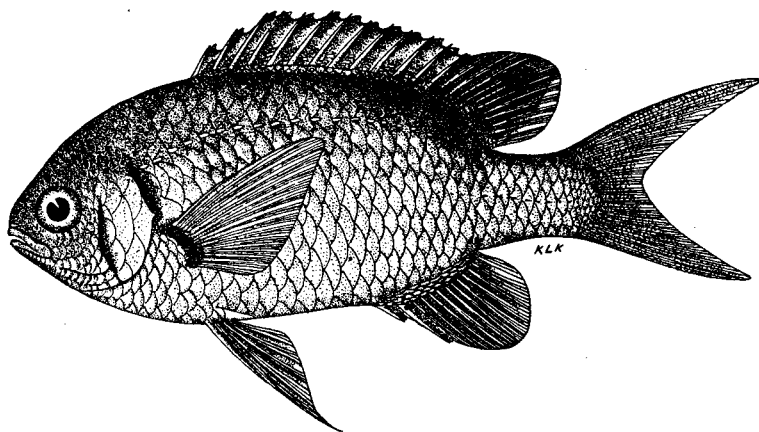


FIG. 339. *Chromis opercularis* (Günther), 92 mm. (after Jones and Kumaran)

Specimens studied: Kalpeni (103), 23 to 66 mm. Minicoy (5), 92 to 119 mm.

D. XIII, 11; A. II, 11; P. ii, 16; V. I, 5. Ll. 18+9; Ltr. 2+1+9.

Head 3.3-3.6 in standard length, 4.2-4.8 in total length. Depth of body 2.2-2.3 in standard length, 3.0-3.2 in total length. Eye 3.1-3.2 in head, 0.6-0.7 in blunt snout and 1.0-1.2 in interorbital space. Preorbital and suborbital scaly. Three transverse rows of scales on preopercle. Pectoral and ventral equal in length, longer than head. Posterior border of preopercle concave. Caudal lobes pointed. Scales upto tip of snout. Colour: Chocolate brown to brownish. A dark vertical stripe along hind preopercle edge and another along the upper part of gill opening. Dorsal and anal brown, posterior rays narrowly whitish. Membranes between ventral rays dark. Pectoral lighter, axil dark. Caudal brownish, posterior margin lighter.

Local names: *Bodunilamahi* (Minicoy). *Barakkotti* (other islands).

Distribution: East coast of Africa, Madagascar, Aldabra, Seychelles and Laccadives.

340. *Chromis simulans* Smith

Chromis simulans Smith, Ichth. Bull., 19, p. 326, fig. 4, 1960. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 191, fig. 2a, 1970.

Specimens studied: Kadamat (21), 20 to 36 mm. Kavarathi (12), 25 to 35 mm.

D. XIII, 11-12; A. II, 11-12; P. ii, 17; V. I, 5. Ll. 17-18+9; Ltr. 2+1+8.

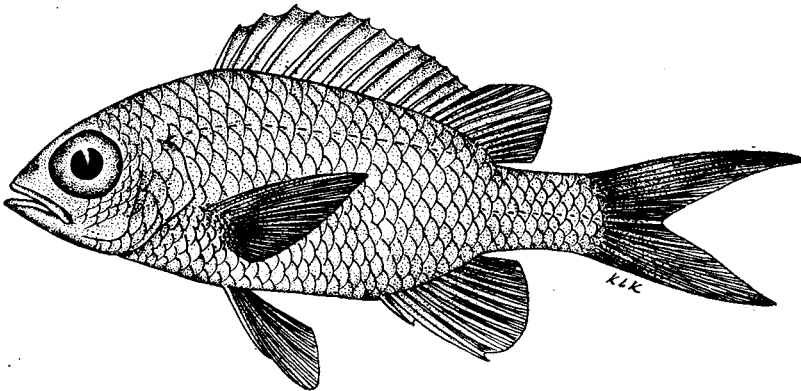


FIG. 340. *Chromis simulans* smith, 34 mm. (after Jones and Kumaran)

Head 3.0-3.2 in standard length, 4.2-4.4 in total length. Depth of body 2.3-2.5 in standard length, 3.4-3.6 in total length. Eye 2.8-3.0 in head, 0.7 in blunt snout and 0.8-0.9 in interorbital space. Preorbital and suborbital scaly. Three rows of scales on preopercle. 4th or 5th dorsal spine longest, about 2 in head. Second anal spine slightly shorter than longest dorsal spine. Pectoral about half length of snout shorter than head. Ventral equal to or slightly longer than pectoral. Caudal lobes pointed. Colour: Somewhat uniform bluish grey above, lighter below. A dark stripe along hind preopercle edge and a dusky stripe along upper part of gill opening. Pectoral clear. Axil of pectoral pale to slightly dusky. Spinous dorsal and three or four front rays of soft dorsal dusky, hind rays light. Anal fin dusky except four hind rays. A dark longitudinal bar along lobes of caudal, median rays light. Front rays of ventral slightly dusky.

Local name: *Padatham* (other islands).

Distribution: Bazaruto northwards, over most of the Western Indian Ocean and Laccadives in the Central Indian Ocean.

341. *Chromis dimidiatus* (Klunzinger)

Heliastes dimidiatus Klunzinger, Verh. Zool., bot. Ges. Wien, **21**, p. 529, 1871.

Chromis dimidiatus de Beaufort, Fishes of the Indo-Australian Archipelago, **8**, p. 460, 1940.

Smith, Fishes of Southern Africa, Ed. 3, p. 507, pl. 51, fig. 746, A, 1953. Jones and Kumaran, Indian J. Fish., **6**, p. 47, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 667, fig. 36, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/284).

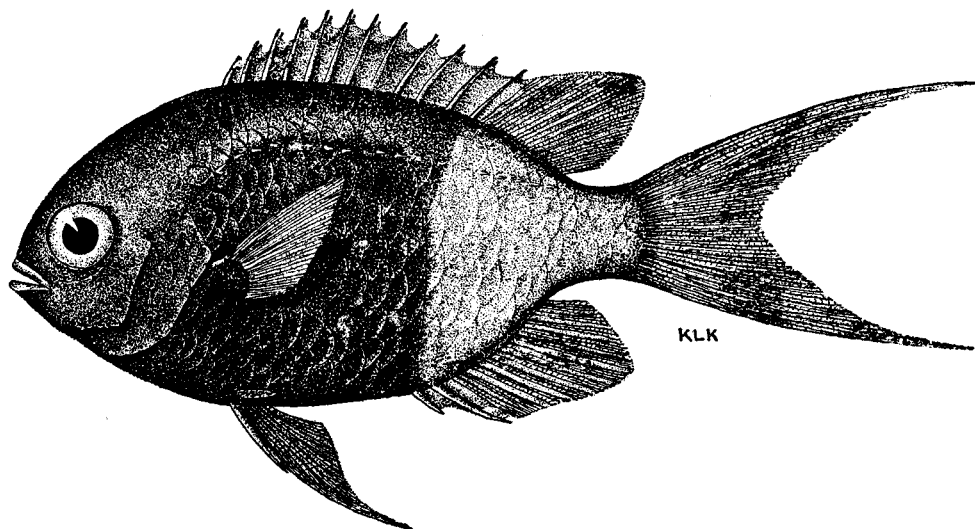


FIG. 341. *Chromis dimidiatus* (Klunzinger), 46 mm.

Specimens studied: Agathi (3), 36 to 44 mm. Ameni (5), 32 to 48 mm. Androth (1), 38 mm. Minicoy (14), 34 to 48 mm.

D. XII, 12; A. II, 12; P. ii, 13-14; V. I, 5. Ll. 16-17 + 8; Ltr. 3+1+8-9.

Head 3.1-3.2 in standard length, 4.7-4.8 in total length. Depth of body 2.0-2.1 in standard length, 2.9-3.0 in total length. Eye 2.6-2.8 in head, 0.5 in snout and equal to or slightly more than convex interorbital space. Narrow band of conical teeth in jaws. Pectoral as long as head. Ventral with the first ray produced, equal to or more than pectoral, shorter in small specimens. Caudal deeply forked, lobes filamentous. Opercular bones not serrated. Colour: Brownish with violet tinge upto the level of first dorsal ray, the posterior half of body and caudal fin yellowish white, the two colours sharply defined. A pale bluish band on suborbital. Spinous dorsal chocolate brown. Soft dorsal and anal yellowish to somewhat dusky. Ventral dark brown. Pectoral light brownish with dark brown base.

Local names: *Ekkibadong-nilamahi* (Minicoy). *Padatham* (other islands).

Distribution: East Africa and Red Sea to the Laccadives, Indonesia, Philippines and Samoan, Society and Hawaiian Islands.

342. *Chromis ternatensis* (Bleeker)

Heliases ternatensis Bleeker, Nat. Tijds. Ned.-Ind., 10, p. 377, 1856.

Chromis ternatensis de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 458, 1940. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Smith, Ichth. Bull., 19, p. 325, fig. 3, 1960. Jones, Proc. Symposium on Scombroid Fishes, p. 668, fig. 37, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/285).

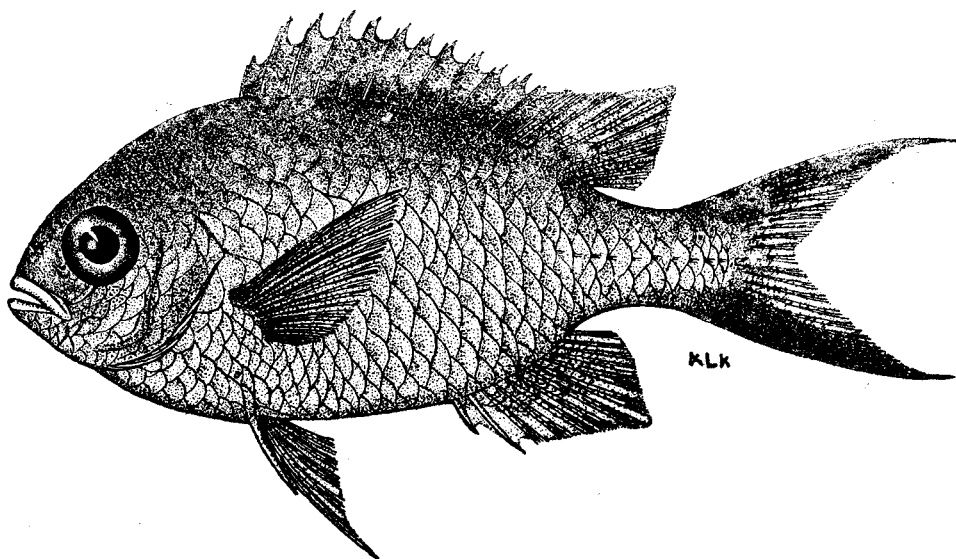


FIG. 342. *Chromis ternatensis* (Bleeker), 52 mm.

Specimens studied: Ameni (13), 30 to 44 mm. Kalpeni (3), 28 to 32 mm. Minicoy (63), 21 to 69 mm. Suheli (4), 26 to 34 mm.

D. XII, 10-11; A. II, (10) 11; P. ii, 15-16; V. I, 5. Ll. 15-16 + 9-10; Ltr. 2 + 1 + 8-9.

Head 3.1-3.4 in standard length, 4.3-4.6 in total length. Depth of body 2.0-2.2 in standard length, 2.7-3.0 in total length. Eye 2.7-3.0 in head, 0.7-0.8 in snout and equal to convex interorbital space. Teeth in jaws conical, the outer row enlarged. Pectoral equal to head. Ventral with the first ray produced, equal to or slightly longer than pectoral. Caudal lobes somewhat filamentous. None of the opercular bones serrated. Colour: Golden brown with greenish tinge above, yellowish to pale on sides and belly. Spinous dorsal brownish with dark edges. Soft dorsal and anal dusky basally, pale distally. Median caudal rays pale yellowish, the lobes deep brown. Ventral pale to dusky. Pectoral pale with upper rays slightly brownish.

Local names: *Nilamahi* (Minicoy). *Barakkotti* (other islands).

Distribution: Coast of East Africa, Laccadives, Indonesia, Philippines and Mariana, Marshall, Samoan and Solomon Islands and New Hebrides.

343. *Chromis nigrurus* Smith

Chromis ternatensis Smith, Mem. Mus. Dr. Alv. Castro, 3, p. 17, fig. 19, 1955 (not of Bleeker).

Chromis nigrurus Smith, Ichth. Bull., 19, p. 325, pl. 29, I, 1960. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 299, fig. 18, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/286).

Specimens studied: Minicoy (11), 27 to 36 mm.

D. XII, 10-11; A. II, 11; P. ii, 15-16; V. I, 5. Ll. 15-16+9-10; Ltr. 2+1+8.

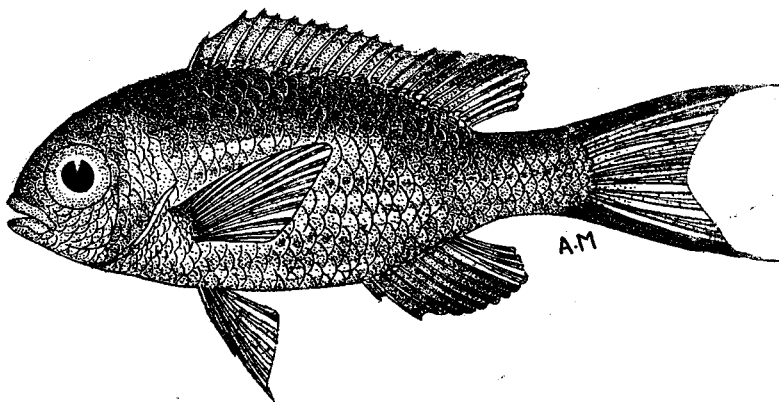


FIG. 343. *Chromis nigrurus* Smith, 34 mm. (after Jones and Kumaran)

Head 3.1-3.3 in standard length, 4.4-4.7 in total length. Depth of body 2.4-2.6 in standard length, 3.4-3.7 in total length. Eye 2.6-2.9 in head, 0.5-0.6 in snout and equal to or slightly more than convex interorbital space. Teeth in jaws small, the outer row slightly enlarged. None of the opercles serrated. Caudal lobes filamentous. Pectoral equal to or slightly shorter than head. Ventral with the first ray produced, equal to or slightly longer than head. Colour: Brownish violet, pale below. Spinous dorsal olive with dusky edges. Anterior rays of soft dorsal and anal brownish to olive, posterior rays lighter. Upper and lower lobes of caudal dark olive, median rays yellowish white. Pectoral and ventral pale.

Local name: *Kalunilamahi* (Minicoy).

Distribution: Inhaca Island northwards to Seychelles in the Western Indian Ocean and Laccadives in the Central Indian Ocean.

344. *Pomacentrus lividus* (Bloch and Schneider)

Chaetodon lividus Bloch and Schneider, Syst. Ichth., p. 235, 1801.

Pomacentrus lividus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 356, 1940. Smith, Ichth. Bull., 19, p. 432, pl. 31, G, 1960. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/287).

Pomacentrus punctatus Day, Fishes of India, p. 384, pl. 80, fig. 8, 1878.

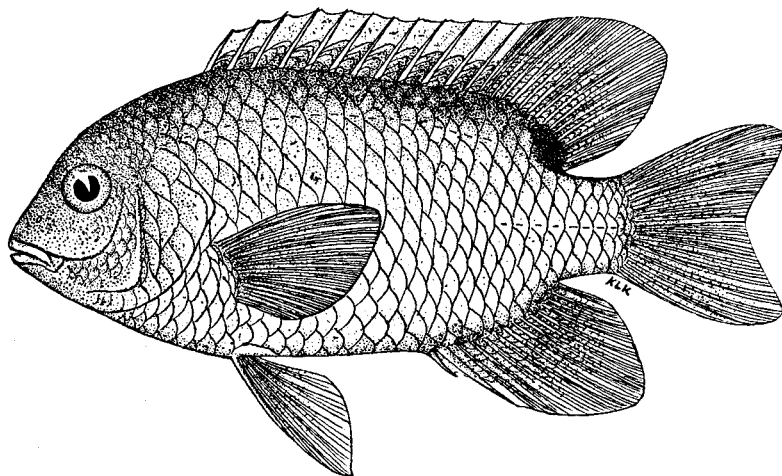


FIG. 344. *Pomacentrus lividus* (Bloch and Schneider), 84 mm.

Specimens studied: Androth (1), 76 mm. Kalpeni (4), 65 to 82 mm. Minicoy (17), 36 to 92 mm.

D. XII, 15-16; A. II, 13; P. ii, 16-17; V. I, 5. Ll. 17-18+8-9; Ltr. 2+1+9.

Head 2.8-3.3 in standard length, 3.7-4.2 in total length. Depth of body 2.1-2.3 in standard length, 2.6-2.7 in total length. Eye 3.7-4.0 in head, 1.2-1.3 in snout and 1.2-1.4 in interorbital space. Teeth uniserial in jaws, truncate. Suborbital and posterior part of preorbital strongly denticulated. Hind margin of preopercle serrated. Suborbital scaly. Three rows of scales on preopercle, a broad inferior and hind edge naked. Scales on head not reaching nostrils. Preorbital depth equals eye diameter. Pectoral half length of eye diameter shorter than head. Ventral equal to or slightly longer than pectoral. Colour: Light brown, some of the scales of head and body with a white spot. A dark spot at the base of posterior dorsal rays. Dorsal and anal brown basally, gradually becoming pale distally. Ventral greyish. Pectoral pale.

Local names: *Kudikiruliya* (Minicoy). *Padatham* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, India, Indonesia and Marshall, Fiji, Society and Marquesas Islands.

345. *Pomacentrus nigricans* (Lacépède)

Holocentrus nigricans Lacépède, Hist. Nat. Poissons, 4, pp. 332 and 367, 1803.

Pomacentrus nigricans de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 357, fig. 46, 1940 (synonymy in part). Munro, Fishes of Ceylon, p. 180, pl. 35, fig. 530, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Smith, Ichth. Bull., 19, p. 342, pl. 31, F and pl. 27, E, 1960. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/288).

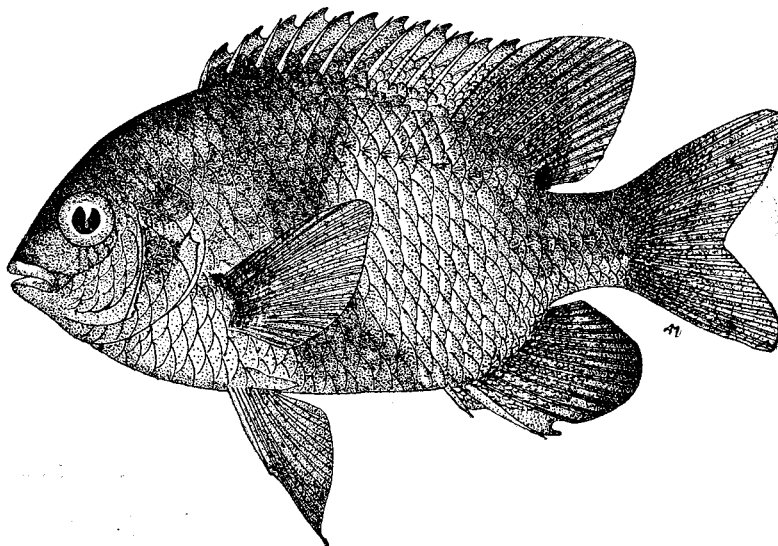


FIG. 345. *Pomacentrus nigricans* (Lacépède), 82 mm.

Specimens studied: Androth (12), 43 to 77 mm. Bangaram (4), 38 to 52 mm. Chetlat (6), 50 to 74 mm. Kadamat (6), 39 to 46 mm. Kalpeni (1), 65 mm. Kavarathi (6), 35 to 80 mm. Minicoy (15), 46 to 84 mm.

D. XII, 15-16; A. II, 12-14; P. ii, 17; V. I, 5. Ll. 18-19 + 8-9; Ltr. 2+1+9.

Head 3.0-3.2 in standard length, 3.7-4.2 in total length. Depth of body 1.9-2.1 in standard length, 2.5-2.8 in total length. Eye 3.0-3.4 in head, equal to or slightly more than length of snout and more than interorbital space. Teeth truncate, in a single row in jaws. Preorbital and suborbital strongly denticulated. Preopercle strongly denticulated behind. Pectoral as long as head. Ventral equal to or slightly more than head, the first ray produced. Scales extending anterior to nostrils. Posterior part of preorbital and suborbital scaly. Preopercle with 3 rows of scales, its flange narrowly naked. Colour: Varies from light brown to dark brown, sometimes with a broad white band from posterior part of spinous dorsal to anal origin. Pectoral with a black basal spot and a black ocellus on

base of posterior dorsal rays. Dorsal and anal brown, darker anteriorly. Caudal and pectoral light brown.

Local names: *Ryburang* (Minicoy). *Padatham* (other islands).

Distribution: East coast of Africa to the Laccadives, Ceylon, Indonesia, Philippines, China and Caroline, Marianas and Marshall Islands and Australia.

346. *Pomacentrus albifasciatus* Schlegel and Müller

Pomacentrus albifasciatus Schlegel and Müller, Verh. Nat. Gesch. Zool., Leiden, 2, p. 21, 1839-41. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/289).

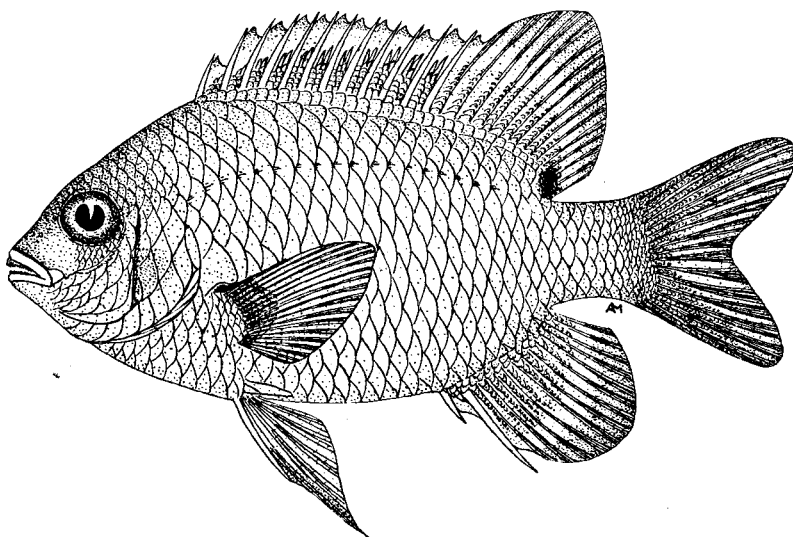


FIG. 346. *Pomacentrus albifasciatus* Schlegel and Müller, 85 mm.

Specimens studied: Agathi (3), 42 to 63 mm. Androth (1), 92 mm. Kiltan (5), 85 to 102 mm. Minicoy (3), 55 to 74 mm.

D. XII, 15-16; A. II, 13-14; P. ii, 17; V. I, 5. Ll. 18-19 + 9; Ltr. 3+1+10.

Head 3.0-3.2 in standard length, 4.1-4.3 in total length. Depth of body 2.0-2.2 in standard length, 2.6-2.7 in total length. Eye 3.3-3.6 in head, 1.0-1.2 in snout and equal to or slightly less than interorbital space. Teeth uniserial, truncate, in jaws. Hind part of preorbital and suborbital strongly serrated. Hind border of preopercle serrated. Suborbital and posterior part of preorbital scaled. Three rows of scales on preopercle, its lower and hind edge naked. Pectoral $\frac{1}{2}$ eye diameter shorter than head. Ventral slightly longer, equal to length of head. Scales on upper part of head reaching nostrils. Colour: Uniform light

brown. Dorsal brown, distal margin darker. A black spot at base of posterior soft dorsal rays. Anal brownish, darker distally. Ventral pale brownish, anterior rays darker. Pectoral pale with a black spot on the base of upper rays. Caudal pale brown.

Local names: *Nagudonkiruliya* (Minicoy). *Padatham* (other islands).

Distribution: Laccadives, Indonesia to the Philippines, Palau Islands, Samoa and Queensland.

347. *Pomacentrus littoralis* Cuvier

Pomacentrus littoralis Cuvier and Valenciennes, Hist. Nat. Poissons, 5, p. 425, 1830. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 364, 1940. Smith, Ichth. Bull., 19, p. 345, 1960. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/290).

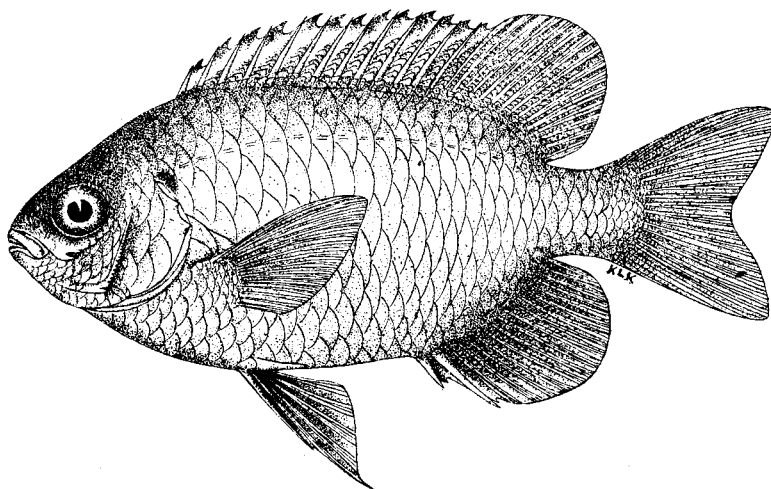


FIG. 347. *Pomacentrus littoralis* Cuvier, 64 mm.

Specimen studied: Kavarathi (1), 64 mm.

D. XIII, 15; A. II, 16; P. ii, 15; V. I, 5. Ll. 18+9; Ltr. 2+1+9.

Head 3.2 in standard length, 4.1 in total length. Depth of body 2.1 in standard length, 2.7 in total length. Eye 3.3 in head, slightly more than snout and equal to interorbital space. Teeth in two rows in jaws. Preorbital with a strong spine posteriorly; suborbital strongly spinate. Hind border of preopercle with strong but blunt spines. Scales on upper part of head reaching to nostrils. Three rows of scales on preopercle, posterior limb naked. Pectoral and ventral subequal, equal to head. Colour: Head and body uniform bluish brown. Blackish spot just below origin of lateral line. Spinous dorsal brown, distal margin

darker. Soft dorsal, anal and ventral darker than body. Pectoral pale. Caudal brown.

Local name: *Padatham* (Kavarathi).

Distribution: Madagascar, Laccadives, Indonesia to the Philippines and Solomon, New Hebrides and Society Islands and Australia.

348. *Pomacentrus albicaudatus* Baschieri-Salvadori

Pomacentrus albicaudatus Baschieri-Salvadori, Riv. Biol. Colon., 15, p. 64, pl. 4, fig. 4, 1955. Smith, Bull., 19, p. 345, pl. 32, M, 1960. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 301, fig. 20, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/291).

Specimens studied: Agathi (4), 48 to 63 mm. Ameni (1), 40 mm. Bitra (1), 50 mm. Chetlat (2), 26 and 28 mm. Kiltan (3), 42 to 48 mm. Minicoy (5), 42 to 60 mm.

D. XIII, 15; A. II, 14-15; P. ii, 14-15; V. I, 5. Ll. 18-19 + 8; Ltr. 2+1+8.

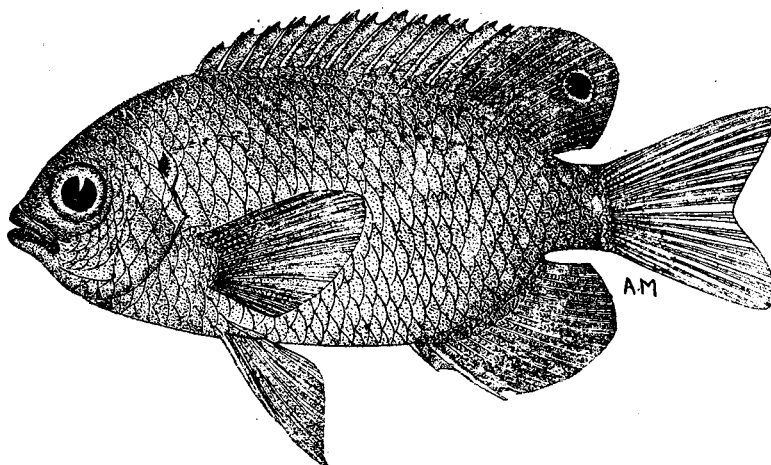


FIG. 348. *Pomacentrus albicaudatus* Baschieri-Salvadori, 42 mm. (after Jones and Kumaran)

Head 3.0-3.3 in standard length, 3.8-4.3 in total length. Depth of body 2.0-2.2 in standard length, 2.6-2.8 in total length. Eye 3.0-3.2 in head. Snout less than eye diameter and equal to interorbital space. Three rows of scales on cheek, flange naked. Preoperculum serrated. Pectoral almost equal to head. Ventral longer than pectoral, the first ray slightly produced. Colour: Uniform dark brown with a black spot at origin of lateral line. A black light edged ocellus between 7th and 11th dorsal rays in small specimens, absent in adults. Dorsal and anal brown, pectoral lighter. Caudal white.

Local names: *Burang* (Minicoy). *Padatham*, *Kotti* (other islands).

Distribution: Known only from the Red Sea and Laccadives. This species is common in the Laccadive Islands.

349. *Pomacentrus pavo* (Bloch)

Chaetodon pavo Bloch, *Naturges. Ausl nd Fische*, 3, p. 60, pl. 198, 1787.

Pomacentrus pavo de Beaufort, *Fishes of the Indo-Australian Archipelago*, 8, p. 385, 1940 (synonymy in part). Smith, *Ichth. Bull.*, 19, p. 344, pl. 29, G and pl. 27, G, 1960. Jones and Kumaran, *J. Mar. biol. Ass. India*, 6, p. 302, fig. 21, 1964. Jones, *Bull. cent. mar. Fish. Res. Inst.*, 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/292).

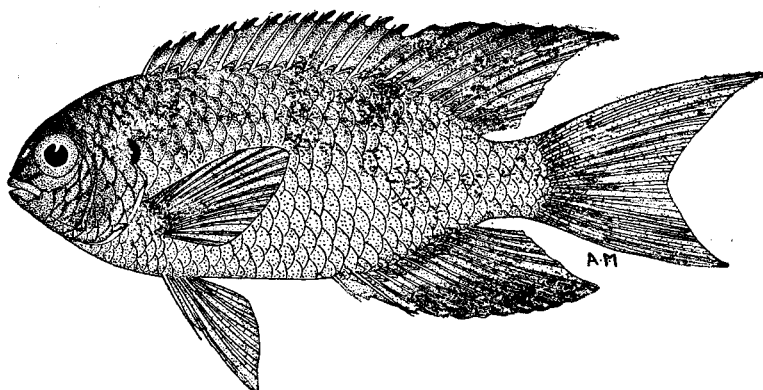


FIG. 349. *Pomacentrus pavo* (Bloch), 63 mm. (after Jones and Kumaran)

Specimens studied: Ameni (8), 41 to 54 mm. Bitra (8), 42 to 50 mm. Kalpeni (9), 27 to 43 mm. Kavarathi (7), 45 to 63 mm. Minicoy (48), 32 to 69 mm.

D. XIII, 13-14; A. II, 13; P. ii, 14-15; V. I, 5. Ll. 16-18+9-10; Ltr. 2+1+9.

Head 3.3-3.7 in standard length, 4.4-5.0 in total length. Depth of body 2.4-2.7 in standard length, 3.3-3.7 in total length. Eye 2.8-3.3 in head, 0.6-0.7 in snout and about equal to interorbital space. Preorbital and suborbital without scales. Two rows of scales on preopercle and one on inferior limb. A deep notch between preorbital and suborbital. Suborbital strongly serrated. Preopercle serrated. Pectoral equal to or shorter than head. Ventral with the first ray produced, equal to or longer than head. Caudal lobes pointed, the upper longer than the lower. Colour: Bluish green, lighter to yellowish below. Scales of head and those before dorsal each with a bluish yellow spot. A bluish yellow band from snout to upper border of eye and another below from upper lip to eye. Sometimes a few dark spots posterior to eye. A bluish black blotch superiorly

on hind border of opercle. Scales on upper part of body often with brownish hind border. Dorsal and anal light bluish brown with broad dark margin. Posterior rays of dorsal and anal lighter. Caudal pale to dusky. Ventral and pectoral hyaline, the base of latter often dusky.

Local names: *Thathali* (Minicoy). *Pachakkotti* (other islands).

Distribution: Tropical Indo-Pacific from the east coast of Africa and Red Sea to the Laccadives, Indonesia, Philippines and Marshall, Mariana, Solomon, Tuamotu, Caroline and Marquesas Islands.

350. *Pomacentrus melanopterus* Bleeker

Pomacentrus melanopterus Bleeker, Nat. Tijds. Ned.-Ind., 3, p. 562, 1852. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 380, 1940. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 190, fig. 2d, 1970.

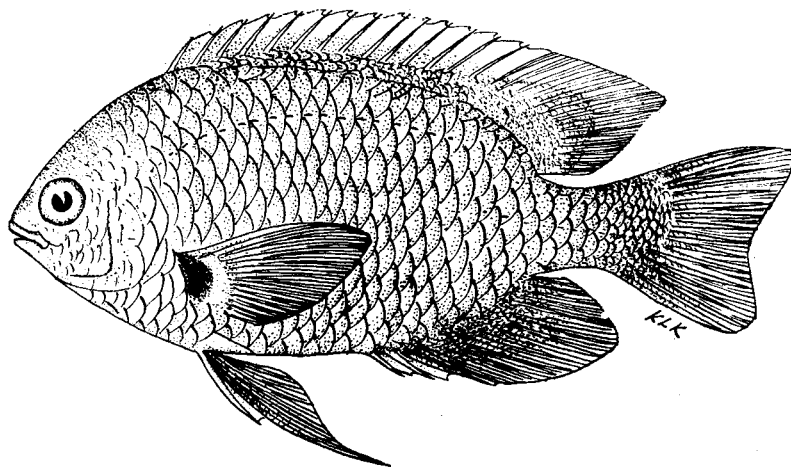


FIG. 350. *Pomacentrus melanopterus* Bleeker, 71 mm. (after Jones and Kumaran)

Specimens studied: Kavarathi (5), 56 to 71 mm.

D. XIV, 13-14; A. II, 14-15; P. ii, 15 (16); V. I, 5. LI. 18+8-9; Ltr. 2+1+9.

Head 3.4-3.6 in standard length, 4.4-4.6 in total length. Depth of body 2.0-2.2 in standard length, 2.5-2.7 in total length. Eye 2.7-2.9 in head, 1.0-1.1 in interorbital space and 0.5-0.6 in snout. Maxillary not reaching to below front border of eye. Preorbital ending posteriorly in a flat spine. Preopercle finely serrate. Preorbital and suborbital naked. Two rows of scales on preopercle and one row on inferior limb. Pectoral longer than head. Ventral longer than pectoral, the first ray slightly produced. Dorsal spines increasing gradually in length

posteriorly, the last as long as snout and eye together. Colour: Dark brown; upper part of head and edge of scales on sides of body darker. Some scales anterior to origin of lateral line with dark spots. Dorsal, anal and caudal fins dark, edges of membranes between dorsal spines darker. A broad black band across base of pectoral; pectoral fin lighter.

Local name: *Padatham* (Kavarathi).

Distribution: Previously known from Indonesia, Ryukyu Islands, Taiwan, and Philippines and Marshall, Solomon and Samoan Islands.

351. *Abudefduf bengalensis* (Bloch)

Chaetodon bengalensis Bloch, Naturges. Ausländ Fische, 3, p. 110, pl. 213, fig. 2, 1787.

Abudefduf bengalensis de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 403, 1940. Smith, Ichth. Bull., 19, p. 332, pl. 30, D, 1960. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/293).

Glyphidodon bengalensis Day, Fishes of India, p. 387, 1878.

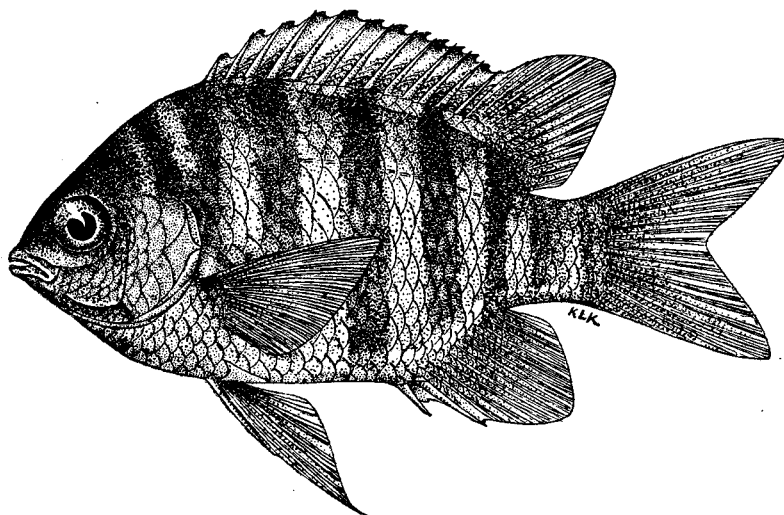


FIG. 351. *Abudefduf bengalensis* (Bloch), 54 mm.

Specimens studied: Minicoy (4), 52 to 54 mm.

D. XIII, 13-14; A. II, 13-14; P. ii, 16; V. I, 5. Ll. 20-21+8; Ltr. 3½+1+11-12.

Head 2.9-3.2 in standard length, 3.9-4.2 in total length. Depth of body 1.6-1.8 in standard length. 2.2-2.4 in total length. Eye 3.3-3.7 in head, equal to or slightly more than snout and 1.0-1.3 in interorbital space. Teeth truncate, in a single series in jaws. Preorbital naked, suborbital with a few scales. Scales on upper part of head reaching almost to nostrils. 3½ rows of scales on pre-

opercle, a narrow inferior and posterior limbs naked. Pectoral as long as head, ventral equal to or slightly longer than pectoral. Colour: Greenish brown above, paler below. Sides with 7 vertical dark brown bands, narrower than the pale interspaces. Vertical fins dusky to brownish. Ventral dusky basally, pale posteriorly. Pectoral light yellowish with a black spot at origin of fin.

Local name: *Burang* (Minicoy).

Distribution: Red Sea and Madagascar to the Laccadives, coasts of India, Indonesia, Philippines, China, Japan and Palau and Samoan Islands.

352. *Abudefduf sexfasciatus* (Lacépède)

Labrus sexfasciatus Lacépède, Hist. Nat. Poissons, 3, p. 430, pl. 19, fig. 2, 1802.

Abudefduf coelestinus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 409, 1940.

Abudefduf sexfasciatus Smith, Fishes of Southern Africa, p. 283, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/294).

? *Glyphidodon coelestinus* Day, Fishes of India, p. 386, pl. 83, fig. 2, 1878.

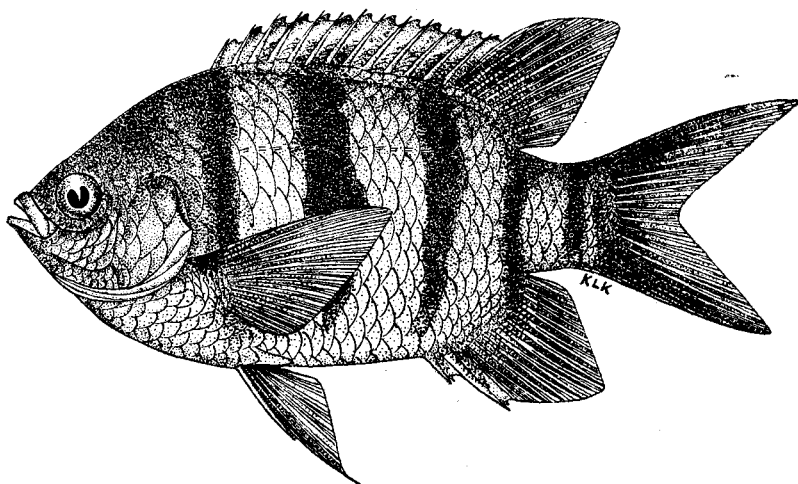


FIG. 352. *Abudefduf sexfasciatus* (Lacépède), 106 mm.

Specimens studied: Agathi (7), 25 to 120 mm. Ameni (1), 65 mm. Bitra (9), 20 to 47 mm. Chetlat (8), 25 to 135 mm. Kadamat (1), 75 mm. Kavarathi (3), 62 to 169 mm. Kiltan (8), 29 to 108 mm. Minicoy (14), 22 to 55 mm. Suheli (1), 65 mm.

D. XIII, 13; A. II, 12-13; P. ii, 16-17; V. I, 5. Ll. 19-20+7-9; Ltr. $3\frac{1}{2}+1+11$.

Head 3.0-3.2 in standard length, 4.2-4.4 in total length. Depth of body 1.8-2.0 in standard length, 2.5-2.7 in total length. Eye 3.4-3.6 in head, 0.8-0.9

in snout and 1.1-1.3 in interorbital space. Teeth uniserial in jaws, truncate. Preorbital and suborbital scaly. $3\frac{1}{2}$ rows of scales on preopercle, the inferior and posterior limbs scaly. Scales on head reaching beyond nostrils. None of the opercles serrated. Pectoral slightly longer than head. Ventral shorter than pectoral and equal to head. Colour: Bluish green on back, becoming pale yellowish below. Sides of body with five dark brown transverse bands narrower than interspaces, tapering and fading ventrally. The second, third and fourth bands continued on to the base of dorsal. A black spot superiorly on base of pectoral. Dorsal blackish. Anal pale yellowish, median part dusky. Caudal pale, lobes with a dusky longitudinal band. Pectoral yellowish. Ventral pale, outer rays dusky.

Local names: *Galiburang* (Minicoy). *Variyan-padatham* (other islands).

Distribution: From the east coast of Africa and Red Sea to the Laccadives, coasts of India, Indonesia, Philippines, Marshall Islands, Japan, Australia and to the Tuamotu Islands.

353. *Abudefduf saxatilis* (Linnaeus)

Chaetodon saxatilis Linnaeus, Syst. Nat., ed. 10, 1 p. 276, 1758.

Abudefduf saxatilis Smith, Fishes of Southern Africa, p. 283, pl. 51, fig. 761, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/295).

Abudefduf saxatilis vaigiensis de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 404, 1940. Munro, Fishes of Ceylon, p. 182, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959.

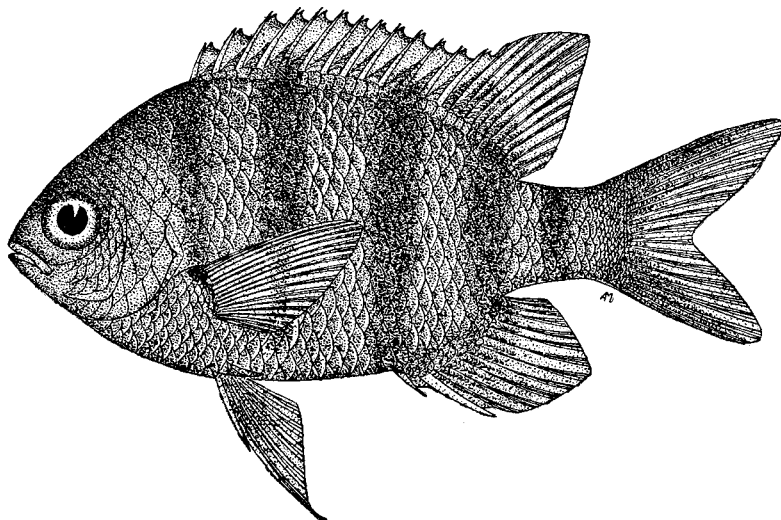


FIG. 353. *Abudefduf saxatilis* (Linnaeus), 68 mm.

Specimens studied: Minicoy (8), 48 to 125 mm. Kalpeni (6), 52-88 mm. D. XIII, 12-13; A. II, 12-13; P. ii, 16-17; V. I, 5. Ll. 20-21+7-9; Ltr. $3\frac{1}{2}+1+11$.

Head 3.0-3.3 in standard length, 4.1-4.4 in total length. Depth of body 1.8-2.0 in standard length, 2.4-2.6 in total length. Eye 3.2-3.6 in head, 0.8 in snout and 1.1-1.3 in interorbital space. Teeth somewhat truncate, uniserial in jaws. Preorbital naked, suborbital scaly. $3\frac{1}{2}$ rows of scales on preopercle, posterior flange naked. Scales on upper part of head reaching to nostrils. Pectoral slightly longer than head. Ventral as long as pectoral. Colour: Dusky yellow to brownish above, pale below with five dark brown transverse bands. Vertical fins light or dark brown, lighter distally. Pectoral yellowish with a black spot at its base. Ventrals dusky to greyish.

Local name: *Galiburang* (Minicoy). *Kalli* (other islands).

Distribution: Widely distributed in the Indo-Pacific: East coast of Africa and Red Sea to the Laccadives, Ceylon, Indonesia, Japan, Australia and Marquesas and Galapagos Islands.

354. *Abudefduf sordidus* (Forskål)

Chaetodon sordidus Forskål, Descript. Animal., p. 62, 1775.

Abudefduf sordidus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 399, 1940. Smith, Fishes of Southern Africa, p. 282, pl. 51, fig. 760, 1949. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/296).

Glyphidodon sordidus Day, Fishes of India, p. 385, pl. 83, fig. 1, 1878.

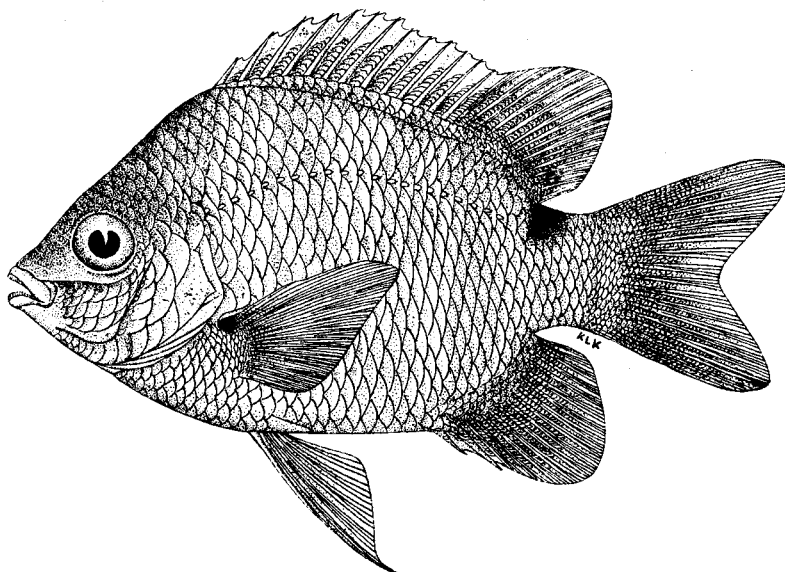


FIG. 354. *Abudefduf sordidus* (Forskål), 84 mm.

Specimens studied: Chetlat (1), 84 mm. Kalpeni (1), 52 mm. Kiltan (1), 49 mm. Minicoy (6), 69 to 71 mm.

D. XIII, 15; A. II, 14-15; P. ii, 15-16; V. I, 5. Ll. 20-21+8-9; Ltr. 4+1+12.

Head 2.7-2.9 in standard length, 3.7-4.0 in total length. Depth of body 1.7-1.9 in standard length, 2.3-2.5 in total length. Eye 3.3-3.7 in head, 1.1-1.4 in snout and 1.0-1.3 in interorbital space. Teeth in a single series in jaws, truncate. Posterior part of suborbital scaled. Three rows of scales on preoperculum, flange naked. Ventral with the first ray produced, equal to head. Pectoral as long as ventral. None of the opercular bones serrated. Colour: Brownish, lighter below with 4-5 pale yellow cross bars below dorsal. A black saddle on caudal peduncle just behind dorsal. Pectoral hyaline with a black blotch superiorly at its base. Ventral dusky. Dorsal and anal brownish. Caudal brownish, pale posteriorly.

Local names: *Lafiburang* (Minicoy). *Padatham* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Indonesia, China, Philippines, Japan, Australia and Society, Marquesas and Hawaiian islands.

355. *Abudefduf septemfasciatus* (Cuvier)

Glyphisodon septemfasciatus Cuvier and Valenciennes, Hist. Nat. Poissons, 5, p. 463, 1830. *Abudefduf septemfasciatus* de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 401, fig. 49, 1940. Munro, Fishes of Ceylon, p. 182, pl. 36, fig. 535, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Smith, Ichth. Bull., 19, p. 333, pl. 29, A, 1960. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/297).

Glyphidodon septemfasciatus Day, Fishes of India, p. 386, pl. 81, fig. 7, 1878.

Specimens studied: Agathi (5), 63 to 136 mm. Ameni (8), 40 to 60 mm. Bitra (5), 15 to 60 mm. Chetlat (5), 25 to 135 mm. Kalpeni (7), 33 to 155 mm. Minicoy (11), 115 to 159 mm.

D. XIII, 13; A. II, 12-13; P. ii, 16; V. I, 5. Ll. 20-21+7-9; Ltr. 3½+1+11-12.

Head 2.9-3.2 in standard length, 3.9-4.2 in total length. Depth of body 1.8-1.9 in standard length, 2.3-2.4 in total length. Eye 3.4-3.8 in head, 1.2-1.4 in snout and 1.3-1.5 in interorbital space. Teeth uniserial in jaws, truncate. Suborbital scaly. Scales not reaching nostrils. Three rows of scales on preopercle, inferior and posterior limbs naked. None of the opercles serrated. Scales on head not reaching nostrils. Pectoral equal to head. Ventral as long as pectoral. Colour: Yellowish brown with seven dark transverse bands. Spinous dorsal pale brown with dark brown edges. Soft dorsal, anal and caudal pale brownish. Pectoral yellowish with basal triangular black spot. Ventrals greyish.

Local names: *Galiburang*, *Rabolu* (Minicoy). *Padatham*, *Kalli* (other islands).

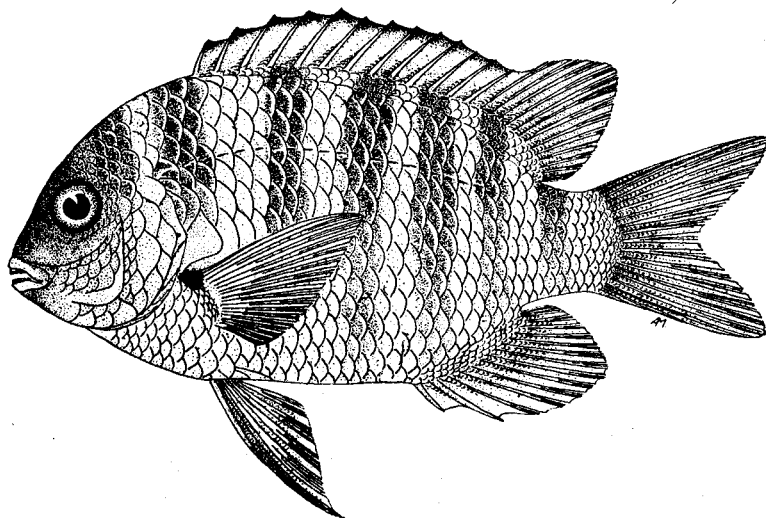


FIG. 355. *Abudefduf septemfasciatus* (Cuvier), 118 mm.

Distribution: From the east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and China to the Marshall, Society and Tuamotu Islands and Australia.

356. *Abudefduf cingulum* (Klunzinger)

Glyphidodon cingulum Klunzinger, Verh. Zool. bot. Ges. Wien, **21**, p. 526, 1871.

Abudefduf cingulum Smith, Ichth. Bull., **19**, p. 334, pl. 31, C and pl. 30, H, H', 1960.

Jones and Kumaran, J. Mar. biol. Ass. India, **6**, p. 296, fig. 14, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/298).

Specimens studied: Ameni (3), 34 to 56 mm. Chetlat (28), 38 to 70 mm. Kiltan (23), 15 to 65 mm. Minicoy (33), 30 to 60 mm.

D. XII, 15-16; A. II, (12) 13; P. ii, 17; V. I, 5. Ll. 19-20+8; Ltr. 3+1+9.

Head 2.9-3.2 in standard length, 4.0-4.2 in total length. Depth of body 1.9-2.1 in standard length, 2.5-2.7 in total length. Eye 3.2-3.4 in head, equal to or longer than snout and equal to interorbital space. Two rows of scales on suborbital. 3-4 rows of scales on preopercle, lower edge naked. A single series of truncate teeth in jaws. None of the opercles serrated. Pectoral shorter than head. Ventral equal to head. Colour: Brownish, lower sides lighter. A broad white bar sometimes present across body below about 6th to 8th dorsal spines. Dorsal and anal dark, soft dorsal pale posteriorly. Caudal lobes dark, lighter

towards extremity. Pectoral light with a dark blotch in axil. Ventral dusky. Young with a spot at the base of last two or three dorsal spines and anterior two or three rays of dorsal.

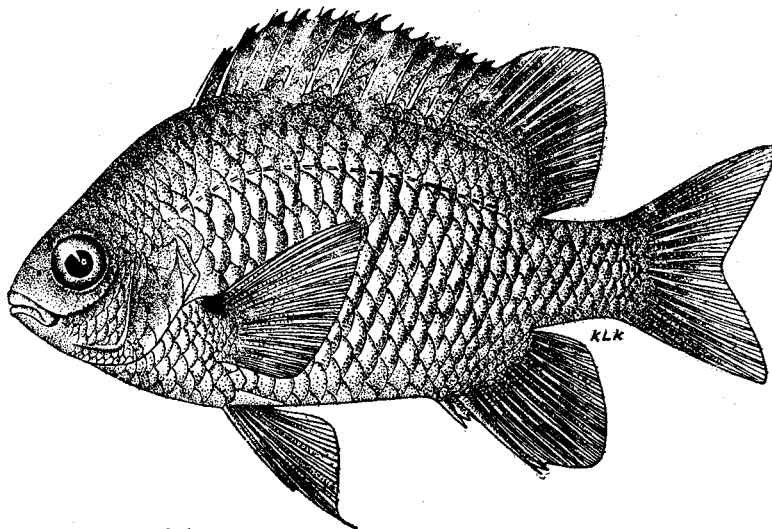


FIG. 356 a. *Abudefduf cingulum* (Klunzinger), 56 mm. (after Jones and Kumaran)

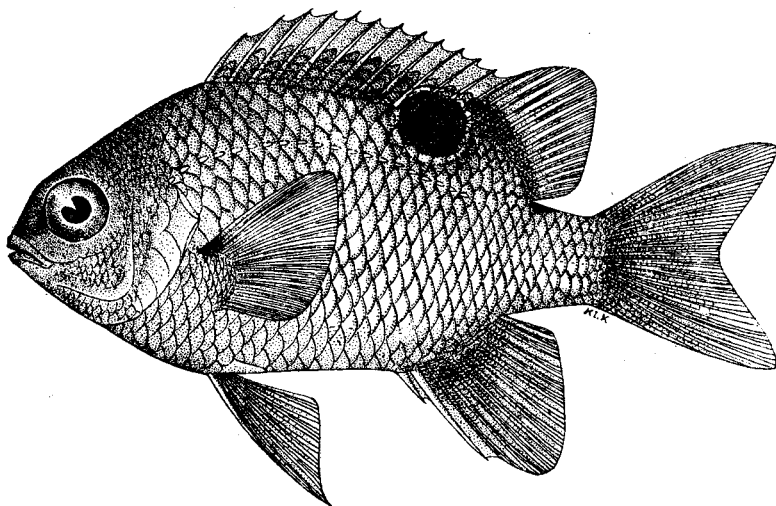


FIG. 356 b. *Abudefduf cingulum* (Klunzinger), 36 mm.

Local names: *Burang* (Minicoy). *Padatham* (other islands).

Distribution: East coast of Africa to Seychelles and the Laccadives.

357. *Abudefduf manikfani* Jones and Kumaran

Abudefduf manikfani Jones and Kumaran, J. Mar. biol. Ass. India, **10**, p. 324, fig. 5, 1968.

Abudefduf sp., Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/518).

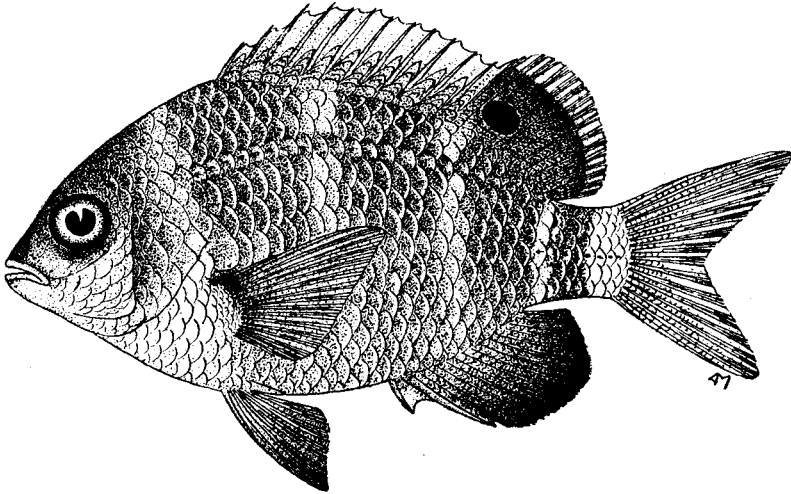


FIG. 357. *Abudefduf manikfani* Jones and Kumaran, 53 mm. (after Jones and Kumaran)

Specimens studied: Kavarathi (4), 40 to 46 mm. Minicoy (5), 31 to 53 mm.

D. XII, 16-17; A. II, 14; P. ii, 16; V. I, 5. Ll. 20-21+8-9; Ltr. 3+1+9.

Head 2.9-3.2 in standard length, 3.8-4.2 in total length. Depth of body 1.8-2.0 in standard length, 2.4-2.6 in total length. Eye 3.0-3.3 in head, 0.7-0.8 in snout and 1.0-1.1 in interorbital space. A single series of slender, compressed teeth in jaws. Preorbital, suborbital, preopercle, opercle, subopercle and interopercle without any serrations. Scales on head reaching to nostrils. Preorbital naked. First spine of dorsal slightly shorter than eye diameter, third or fourth dorsal spine longest, slightly shorter than snout and eye together. Second anal spine as long as third dorsal spine. Pectoral fin equal to or slightly shorter than head. Ventral shorter than pectoral. Colour: Chocolate brown, breast and lower sides of head lighter. Four vertical white bars on sides, the first from nape across hind border of opercle, second from base of 4th to 5th or 6th dorsal spine down to front of vent, third from base of last dorsal spine and first dorsal ray to base of middle of anal and the fourth on caudal peduncle. A broad dark brown ring on caudal peduncle immediately behind the fourth white transverse

bar. Dorsal greyish brown, distal part of soft dorsal clear; a black spot at basal part of 2nd to 6th or 7th dorsal rays. Anal fin dark brown. Caudal pale yellowish. Pectoral gray, axil of pectoral blackish. Ventral greyish brown.

Distribution: Laccadives. Now known to occur in Maldives also.

Note: This species differs from *Abudefduf phoenixensis* Schultz, a closely related species from the Pacific by its low pectoral count (ii, 16 as against ii, 18-19 in *A. phoenixensis*), the third or fourth dorsal spine being longest (12th spine longest in *A. phoenixensis*) and the presence of black spot on the basal part of 2nd to 6th or 7th dorsal rays (black spot near margin of 4th to 7th dorsal rays in *A. phoenixensis*). Differs from *A. albofasciatus* Hombron and Jacquinot in fin formula and in having a spot on soft dorsal.

358. *Abudefduf lacrymatus* (Quoy and Gaimard)

Glyphisodon lacrymatus Quoy and Gaimard, Voy. *Uranie*, Zoologie, 2, p. 388, pl. 62, fig. 7, 1824.

Abudefduf lacrymatus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 439, 1940. Smith, Fishes of Southern Africa, p. 283, pl. 50, fig. 764, 1949. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 27/299).

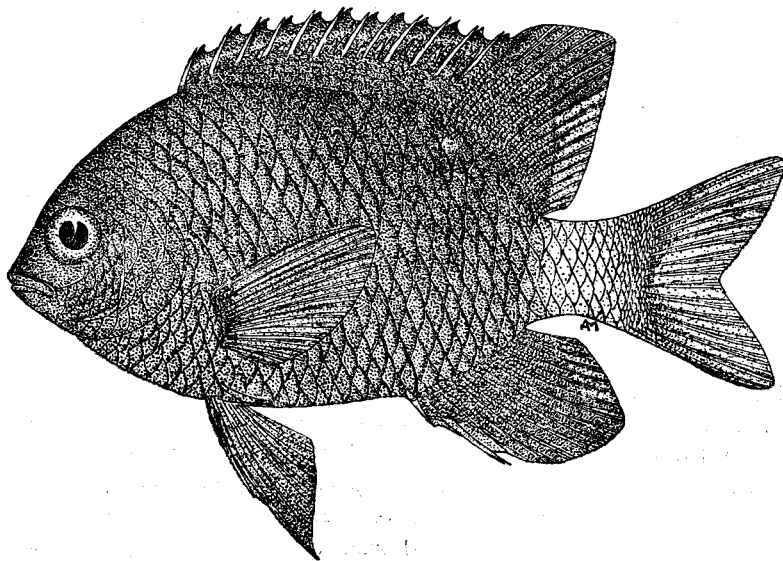


FIG. 358. *Abudefduf lacrymatus* (Quoy and Gaimard), 62 mm.

Specimens studied: Bitra (2), 20 and 22 mm. Chetlat (3), 72 to 80 mm. Kalpeni (1), 60 mm. Minicoy (1), 62 mm.

D. XII, 16-17; A. II, 13; P. ii, 16; V. I, 5. LI. 18-19+2; Ltr. 3+1+9.

Head 2.9-3.1 in standard length, 3.6-4.0 in total length. Depth of body 1.8-1.9 in standard length, 2.4-2.5 in total length. Eye 3.2-3.3 in head, longer

than snout and equal to interorbital space. A single row of somewhat truncate teeth in jaws. Three transverse rows of scales on preopercle, the inferior and posterior limbs scaled. Scales on head reaching anterior to nostrils. Preorbital and suborbital scaled. None of the opercular bones serrated. Pectoral almost equal to head. Ventral with the first ray produced, longer than pectoral. Caudal lobes rounded. Colour: Dark brown, caudal peduncle and caudal pale. In life, light blue spots on head and upper sides of body. Dorsal dark brown, distal part of posterior rays pale. Anal dark brown. Ventrals blackish. Pectoral dusky, axil blackish.

Local names: *Ryburang* (Minicoy). *Padatham* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, Indonesia, Philippines, New Hebrides, Samoa and Tahiti.

359. *Abudefduf dickii* (Lienard)

Glyphisodon dickii Lienard, Soc. Hist. Nat. Maurice, Dix Rap., p. 35, 1839.

Abudefduf dicki Smith, Ichth. Bull., 19, p. 335, pl. 26, B & C, 1960.

Abudefduf dickii de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 442, 1940.

Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 297, fig. 15, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/300).

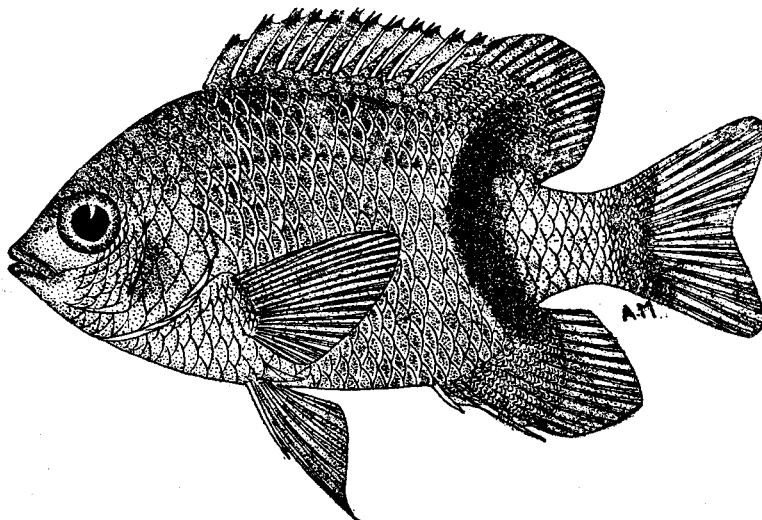


FIG. 359. *Abudefduf dickii* (Lienard), 41 mm. (after Jones and Kumaran)

Specimens studied: Bangaram (3), 15 to 24 mm. Minicoy (1), 41 mm.

D. XII, 17; A. II, 14; P. ii, 16-17; V. I, 5. Ll. 20+8; Ltr. 2+1+8-9.

Head 2.9-3.0 in standard length, 3.7-3.8 in total length. Depth of body 1.8-1.9 in standard length, 2.3-2.4 in total length. Eye more than 3 in head,

more than snout and interorbital space. A single series of compressed teeth in jaws. None of the opercles serrated. Preorbital and suborbital scaly. Preoperculum with three rows of scales, limbs scaly. Pectoral slightly shorter than head. Ventral as long as head, the first ray produced. Colour: Brownish with a broad crescent shaped black band from median rays of soft dorsal to posterior rays of anal. Caudal peduncle, caudal and posterior parts of soft dorsal and anal creamy white. Spinous dorsal light brown with dark edge. Anal blackish anteriorly.

Distribution: East coast of Africa, Seychelles and Mauritius to the Laccadives, Indonesia, Philippines and Solomon, Samoan and Society Islands.

360. *Abudefduf biocellatus* (Quoy and Gaimard)

Glyphisodon biocellatus Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 389, 1825.

Abudefduf biocellatus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 436, 1940 (synonymy in part). Smith, Fishes of Southern Africa, p. 284, pl. 50, fig. 769 (synonymy in part). Munro, Fishes of Ceylon, p. 183, pl. 36, fig. 539, 1955. Jones and Kumaran, Indian J. Fish., 6, pp. 47 and 51, fig. 6, C, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 666, fig. 34, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/301).

Glyphidodon antjerius Day, Fishes of India, p. 387, pl. 81, fig. 4, 1878 (synonymy in part).

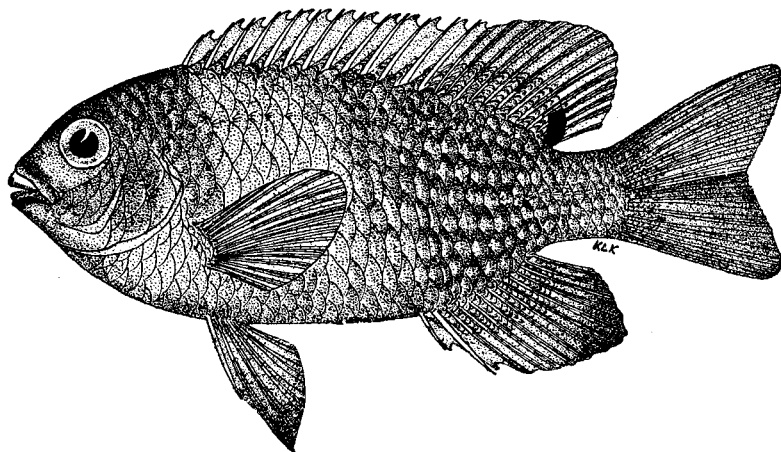


FIG. 360. *Abudefduf biocellatus* (Quoy and Gaimard), 68 mm.

Specimens studied: Agathi (22), 16 to 50 mm. Androth (5), 28 to 45 mm. Bitra (10), 15 to 47 mm. Chetlat (8), 15 to 45 mm. Kadamat (11), 20 to 45 mm. Kalpeni (12), 20 to 40 mm. Kavarathi (27), 12 to 49 mm. Kiltan (14), 15 to 48 mm. Minicoy (48), 22 to 68 mm.

D. XIII, 12-14; A. II, 12-13; P. ii, 15-16; V. I, 5. Ll. 17-19+8-9; Ltr. 2+1+8-9.

Head 3.1-3.3 in standard length, 4.0-4.3 in total length. Depth of body 2.3-2.5 in standard length, 2.9-3.2 in total length. Eye 2.9-3.3 in head, 0.7-0.8 in snout and about equal to convex interorbital space. None of the opercular bones serrated. Teeth in two rows in jaws. Pectoral shorter than ventral. Ventral with the first ray produced, equal to or shorter than head. Colour: Variable. In life yellowish brown, lighter below. Scales of sides with azure, blue spots. A blue band from snout, through upper border of eye, along base of dorsal and terminating in a large black ocellus bordered by blue on the bases of the posterior dorsal spines and anterior rays. Another black blotch on the base of posterior rays extending on the body. These two blotches tend to unite in large specimens. In another variety, only the posterior blotch on base of hind rays of dorsal is present and the anterior part of body upto 6th or 7th dorsal spines is broadly lighter. A bluish line from upper lip to eye, sometimes continued posterior to eye or with some scattered blue spots posterior to eye. Dorsal brownish with dark edges. Anal pale to brownish. Caudal dusky. Pectoral pale yellowish. Ventral dusky, inner rays lighter.

Local names: *Rammas* (Minicoy). *Neelapadatham* (other islands).

Distribution: From the Red Sea and east coast of Africa to the Laccadives, India, Ceylon, Indonesia and Mariana, Marshall and Tuamotu Islands and Japan and Australia.

361. *Abudefduf uniocellatus* (Quoy and Gaimard)

Glyphisodon uniocellatus Quoy and Gaimard, Voy. *Uranie*, Zoologie, 2, p. 393, pl. 64, fig. 4, 1825.

Abudefduf uniocellatus Munro, Fishes of Ceylon, p. 182, pl. 36, fig. 537, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 19, 1969 (Cat. No. CMFRI-LA-F. 67/302).

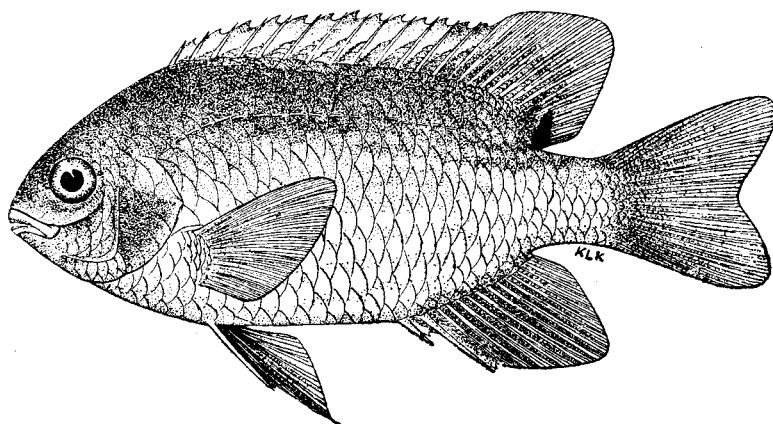


FIG. 361. *Abudefduf uniocellatus* (Quoy and Gaimard), 62 mm.

Specimens studied: Agathi (6), 44 to 70 mm. Ameni (5), 40 to 82 mm. Bitra (9), 56 to 62 mm. Chetlat (13), 54 to 83 mm. Kalpeni (9), 50 to 80 mm. Kavarathi (10), 42 to 75 mm. Kiltan (5), 43 to 92 mm. Minicoy (15), 50 to 64 mm.

D. XIII, 13 (14); A. II, 12-13; P. ii, 16; V. I, 5. Ll. 17-18+8-9; Ltr. 2+1+9.

Head 3.2-3.5 in standard length, 4.0-4.3 in total length. Depth of body 2.1-2.3 in standard length, 2.7-3.0 in total length. Eye 3.0-3.5 in head, 0.8-1.0 in snout and equal to interorbital space. Two series of teeth in jaws. Preorbital and suborbital naked. Two rows of scales on preopercle, the inferior and posterior limbs naked. None of the opercles serrated. Pectoral half length of snout shorter than head. Ventral as long as head. Colour: Bluish brown, lower sides of head, chest and abdomen lighter or whitish. An indistinct brownish band from snout to the front border of eye sometimes present. Spinous dorsal and anal pale brownish. A black blotch at the bases of posterior rays of soft dorsal. Pectoral whitish. Ventral brownish, inner rays lighter.

Local names: *Kiruliyamas* (Minicoy). *Padatham*, *Kotti* (other islands).

Distribution: From the Laccadives and Ceylon to Indonesia, Philippines and Solomon, Mariana and Marquesas islands.

362. *Abudefduf xanthozona* (Bleeker)

Glyphisodon xanthozona Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 283, 1853.

Abudefduf xanthozona de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 434, 1940. Munro, Fishes of Ceylon, p. 182, pl. 36, fig. 538, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 67/303).

Abudefduf xanthozonus Smith, Ichth. Bull., 19, p. 337, pl. 31, B, 1960.

Specimens studied: Agathi (10), 39 to 64 mm. Ameni (7), 40 to 53 mm. Bitra (1), 41 mm. Kadamat (7), 45 to 56 mm. Kavarathi (5), 45 to 65 mm. Kiltan (11), 42 to 68 mm. Minicoy (46), 37 to 56 mm.

D. XIII, 12-13; A. II, 11-12; P. ii, 15-16; V. I, 5. Ll. 18-19+8-9; Ltr. 2+1+9.

Head 3.3-3.5 in standard length, 4.2-4.6 in total length. Depth of body 2.4-2.7 in standard length, 3.0-3.4 in total length. Eye 3.0-3.3 in head, more than snout and interorbital space. Two rows of teeth in jaws. Preorbital and suborbital naked. Three rows of scales on preopercle, flange naked. Pectoral shorter than head. Ventral as long as length of head. Colour: Greyish brown with three or four transverse yellowish bands along sides. The first band at the hind border of operculum, the second below 5th-6th dorsal spines to before

anal fin, the third from base of anterior dorsal rays to the base of median rays of anal and the fourth on caudal peduncle. Dorsal and anal brown. A dark blotch at base of the posterior rays of dorsal. Ventral brown. Caudal dusky brown basally and distally, creamy in the middle. Pectoral pale.

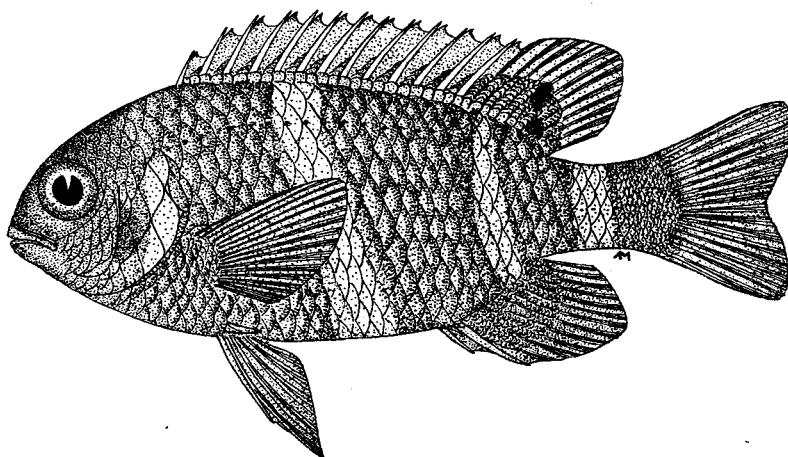


FIG. 362. *Abudehduf xanthozona* (Bleeker), 44 mm.

Local names: *Kiruliyamas* (Minicoy). *Padatham* (other islands).

Distribution: From the east coast of Africa, ⁶Seychelles, Laccadives, Ceylon, Indonesia, Philippines, Japan, Hawaii, Tahiti and Australia.

363. *Abudehduf zonatus* (Cuvier)

Glyphisodon zonatus Cuvier and Valenciennes, Hist. Nat. Poissons, 5, p. 483, 1830.

Abudehduf zonatus Smith, Ichth. Bull., 19, p. 337, pl. 28, G, and pl. 30 A, 1960. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat No. CMFRI-LA-F. 67/304).

Specimens studied: Agathi (21), 37 to 75 mm. Ameni (11), 32 to 83 mm. Bitra (8), 45 to 49 mm. Chetlat (29), 35 to 82 mm. Kalpeni (17), 45 to 82 mm. Minicoy (9), 54 to 79 mm.

D. XIII, 12-13; A. II, 12-13; P. ii, 15-16; V. I, 5. Ll. 17-18+8-9; Ltr. 2+1+8.

Head 3.2-3.5 in standard length, 4.2-4.4 in total length. Depth of body 2.2-2.5 in standard length, 2.8-3.2 in total length. Eye 3.2-3.4 in head, 0.8-1.0 in snout and equal to or slightly more than interorbital space. Teeth in two rows in jaws. None of the opercles serrated. Three rows of scales on cheek, flange naked. Pectoral shorter than head. Ventral equal to head. Colour: Uniform olive brown with broad whitish transverse area below 4th-7th dorsal spines. This white area is sometimes indistinct or even absent. A large black ocellus

at the base of last 3 or 4 dorsal spines and a black blotch at the base of last dorsal rays. Vertical fins more or less dusky brown. Pectoral brownish.

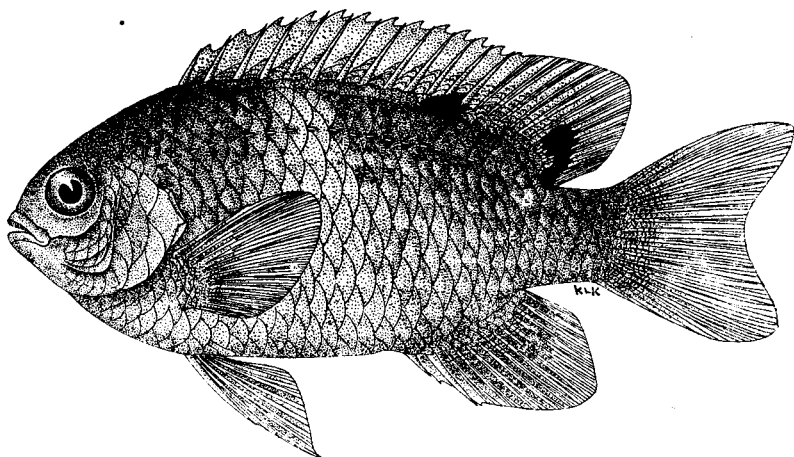


FIG. 363. *Abudejduf zonatus* (Cuvier), 69 mm.

Local names: *Kiruliyamas* (Minicoy). *Padatham* (other islands).

Distribution: From the east coast of Africa to the Laccadives, Indonesia, Philippines, Ryukyus and Maraina and Marshall Islands, Japan and Australia.

364. *Abudejduf glaucus* (Cuvier)

Glyphisodon glaucus Cuvier and Valenciennes, Hist. Nat. Poissons, 5, p. 475, 1830.

Abudejduf glaucus Smith, Ichth. Bull., 19, p. 336, pl. 29, F, 1960. Jones, Bull. cent. mar.

Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 67/305).

Glyphidodon modestus Day, Fishes of India, p. 388, pl. 81, fig. 6, 1878.

Specimens studied: Agathi (8), 25 to 74 mm. Ameni (9), 25 to 76 mm. Androth (4), 32 to 48 mm. Bitra (13), 25 to 85 mm. Chetlat (8), 59 to 76 mm. Kadamat (8), 28 to 80 mm. Kalpeni (18), 17 to 75 mm. Kavarathi (8), 24 to 82 mm. Minicoy (17), 48 to 75 mm.

D. XIII, 12; A. II, 12; P. ii, 15-16; V. I, 5. Ll. 17-18+8-9; Ltr. 2+1+8-9.

Head 3.1-3.4 in standard length, 4.1-4.4 in total length. Depth of body 2.1-2.4 in standard length, 2.7-3.0 in total length. Eye 3.2-3.5 in head, equal to length of snout and also to convex interorbital space. None of the opercles serrated. Pectoral about 1/2 length of snout shorter than head. Ventral equal to or slightly shorter than head. Preorbital and suborbital naked. Three rows of scales on preopercle, its flange naked. Colour: Head and upper parts of sides uniform yellowish brown, lighter below. An indistinct bluish line from upper

lip to eye sometimes present. Spinous dorsal dusky. Soft dorsal and anal pale basally, distal parts dusky. Caudal pale, the distal part of median rays dusky. Ventral pale. Pectoral pale yellowish.

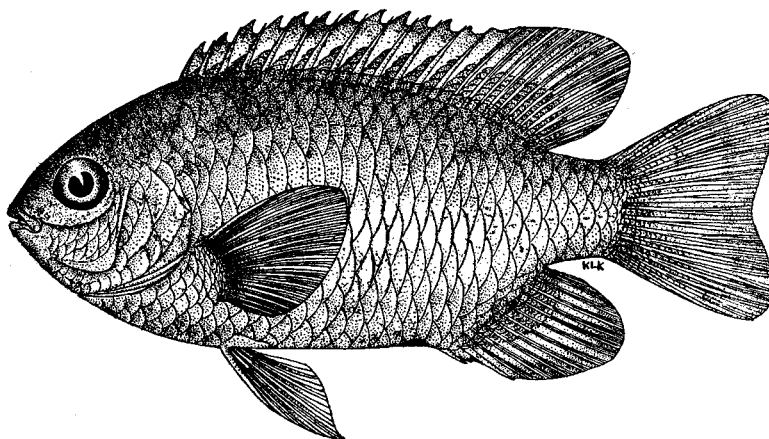


FIG. 364. *Abudegduf glaucus* (Cuvier), 74 mm.

Local names: *Kiruliyamas* (Minicoy). *Padatham* (other islands).

Distribution: East coast of Africa and the Laccadives to the coasts of India, Indonesia, Philippines and Ryukyu, Tuamotu, Marshall and Mariana Islands.

Family LABRIDAE

Mouth moderate to protractile. Teeth generally in a single series in jaws, the anterior ones often canines or compressed incisors; sometimes a canine at corner of mouth. Lower pharyngeals united which bears granular or conical teeth. Lateral line smoothly curved, abruptly bent below end of soft dorsal or interrupted with the hind part below on caudal peduncle.

1. Eleven dorsal spines. Preopercle margin denticulate. Lateral line interrupted *Cirrhilabrus exquisitus*
Eight to ten dorsal spines 2
2. Lateral line continuous 3
Lateral line interrupted, hind part below on caudal peduncle 31
3. Two large flat incisors projecting forwards anteriorly in jaws 4
Front teeth normal or canines 5
4. Dorsal and anal with dark edged bluish ocelli
..... *Anampses caeruleopunctatus*
Dorsal and anal with light longitudinal bands; five narrow longitudinal bands
below pectoral upto above anal fin *Anampses amboinensis*

- Dorsal with light elongate ocelli or longitudinal bands; anal with longitudinal bands; often a broad whitish bar below fifth or sixth dorsal spine
..... *Anampses diadematus*
5. Body elongate and cylindrical. Lateral line smoothly curved
..... *Cheilio inermis*
Body less elongate and compressed. Lateral line abruptly bent below end of soft dorsal 6
6. Eight dorsal spines 7
Nine dorsal spines 14
7. Snout long and tubular 8
Snout normal 9
8. Caudal semi-lunate, outer rays prolonged and dark brown
..... *Gomphosus coeruleus*
Caudal truncate; dorsal and anal light brownish to dark brown with narrow white edge *Gomphosus varius*
9. Head completely naked. Dorsal half brownish, separated from the light undersides by a dark median longitudinal band
..... *Thalassoma amblycephalus*
A scaly patch superior to opercle 10
10. Body with conspicuous dark transverse bands 11
Body without distinct transverse bands; with or without dark longitudinal bands 12
11. Head with 4-5 broad bands; a black blotch between anterior anal rays
..... *Thalassoma hardwicki*
Sides of head without bands; no black blotch between anterior anal rays
..... *Thalassoma janseni*
12. No dark longitudinal or transverse bands. Pectorals light with an elongate dark blotch. Scales of body with vertical brown stripes
..... *Thalassoma lunare*
Body with more or less distinct longitudinal bands 13
13. Head with irregular brown stripes and spots. Caudal somewhat rounded
..... *Thalassoma umbrostigma*
Upper part of head light with a triangular dark edged prolongation on sides of snout. Caudal somewhat rounded with slightly produced lobes
..... *Thalassoma purpurea*
Head with curved bands radiating from eye. Caudal truncate with slightly produced lobes *Thalassoma quinquevittata*
14. Cheeks scaly 15
Cheeks naked or with a few scales only 18

15. Preopercle margin denticulated. Membranes between anterior dorsal spines and anal spines filamentous *Duymaeria flagellifera*
 Preopercle margin smooth. Membranes between anterior dorsal spines and anal spines not filamentous 16
16. Lower lip separated into two by a median frenulum; canines in front of jaws somewhat curved. A bluish black band from snout to end of caudal *Labroides dimidiatus*
 Lips very thick, lower split in the middle; 2 almost horizontal front canines in both jaws 17
17. Dark brown with four narrow yellowish transverse bars on sides. Pectoral base dark *Hemigymnus fasciatus*
 Body behind base of pectoral dark. Pectoral base not dark *Hemigymnus melapterus*
18. Scales large; Ll. less than 30 19
 Scales small; Ll. more than 60 30
19. 2-4 canines anteriorly in jaws 20
 No canines anteriorly in jaws 26
20. Four canines in each jaw, the posterior canines in upper jaw directed backwards *Macropharyngodon meleagris*
 Two or four almost straight canines in the jaws 21
21. A small patch of scales on upper part of opercle 22
 Head naked except occiput 23
22. No scales behind or below eye. A creamy white patch above origin of lateral line *Halichoeres scapularis*
 Scales present behind and below eye. A creamy white area at base of fourth dorsal spine and below on body followed by a black patch *Halichoeres centriquadrus*
23. Low scaly sheath for dorsal and anal 24
 No scaly sheath for dorsal and anal 25
24. Blackish green with green bands on head. A dark violet band on caudal with light ocelli *Halichoeres marginatus*
 A small black ocellus between first two dorsal spines and another ocellus between second and fifth dorsal rays *Halichoeres notopsis*
25. A dark blotch between anterior dorsal rays. Body with dark blotches *Halichoeres kawarin*
 No dark blotch on soft dorsal. Dorsal and anal with light ocelli. Scales on body with a light centre *Halichoeres argus*
26. A creamy spot above axil of pectoral. 2-4 blackish spots on caudal peduncle *Stethojulis axillaris*
 Caudal peduncle without blackish spots 27

27. Lower half of body light with brown spots. Depth 3.0-3.3
 *Stethojulis phkadopleura*
 Colouration not as above 28
28. A silvery band edged dark above from snout to opercle. 5 or 6 silvery streaks formed by spots on lower part of sides ... *Stethojulis strigiventer*
 Head and body with reddish blue longitudinal bands 29
29. Third band ending 6 scales behind head; fourth band from below corner of mouth, passing just under ventral edge of pectoral base to caudal fin
 *Stethojulis trilineata*
 Second band ending 5 scales behind head; third band from snout, passing just above pectoral base to base of median caudal rays; fourth band from corner of mouth, curving across cheek and opercle and upwards to pectoral base and backwards to base of caudal ... *Stethojulis albovittata*
30. Ll. more than 100. No canine at corner of mouth
 *Hologymnosus semidiscus*
 Ll. less than 80. A posterior canine generally present. Upper canines straight 31
31. Yellowish with greenish tinge and with large blackish spots on sides of body. A curved band from below corner of mouth passing towards base of second dorsal spine *Coris formosa*
 Dark purplish brown. A broad band from behind eye to upper part of operculum *Coris gaimardi*
 Brownish violet with 10 broad dark brown cross bands on sides of body. A band from interopercle to corner of mouth passing obliquely upwards and ending below fourth dorsal spine *Coris frerei*
32. Scales small; Ll. more than 70 *Cymolutes lecluse*
 Scales large; Ll. less than 30 33
33. First and second dorsal spines flexible 34
 All dorsal spines pungent and rigid 35
34. Head keeled. First two dorsal spines produced and quite separate from the following spines. Head almost naked *Iniistius pavo*
 Head not keeled. A few rows of scales on cheeks. Three black scales behind base of pectoral *Novaculichthys taeniourus*
35. Mouth extensible as tube. Mandible produced backwards, reaching far behind eye *Epibulus insidiator*
 Mouth and mandible normal 36
36. Second anal spine longer than third. Lateral canines in upper jaw bent backwards and outwards *Pseudocheilinus hexataenia*
 Third anal spine longer than second 37
37. 10 dorsal spines *Cheilinus chlorurus*
 9 dorsal spines 38

38. Depth 2.8-3.0. 6-8 blackish oblique lines on lower part of head
 *Cheilinus diagrammus*
 Depth 2.4-2.7. No oblique blackish line on lower part of head 39
39. Inferior limb of preopercle scaly. Upper lip with two brownish spots on
 either side. A dark spot between first and second dorsal spines
 *Cheilinus oxycephalus*
 Inferior limb of preopercle naked. Colour not as above 40
40. Two blackish stripes from eye towards upper lip and two black stripes from
 eye obliquely upwards. Scales on sides of body with vertical yellowish
 stripes *Cheilinus undulatus*
 No blackish stripes on head as above 41
41. Greenish brown with four dark blotches on sides of body. Scales on body
 with 1-3 white vertical lines. Four white to pink streaks from eye to
 maxillary and corner of mouth and another obliquely below eye. Caudal
 greenish brown, posterior border lighter *Cheilinus trilobatus*
 Pale yellowish with 6 black transverse bands on sides. White stripes radiat-
 ing from eye. Caudal yellowish with dark basal and marginal bands
 *Cheilinus fasciatus*

365. *Cirrhilabrus exquisitus* Smith

Cirrhilabrus exquisitus Smith, Ichth. Bull. 7, p. 109, fig. 4, pl. II, E, 1957. Smith and Smith,
 Fishes of Seychelles, p. 38, pl. 80, E, 1963. Jones, Bull. cent. mar. Fish. Res. Inst.,
 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/306).

Cirrhilabrus temmincki Jones and Kumaran, Indian J. Fish., 6, p. 47 (not of Bleeker).

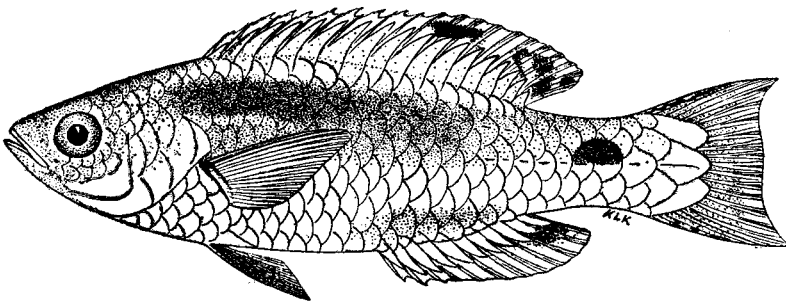


FIG. 365. *Cirrhilabrus exquisitus* Smith, 44 mm.

Specimens studied: Minicoy (8), 30 to 58 mm.

D. XI, 9; A. III, 9; P. ii, 13-14; V. I, 5. Ll. 17-18+7-9; Ltr. 2+1+6-7.

Head 3.0-3.2 in standard length, 3.6-3.8 in total length. Depth of body
 3.2-3.4 in standard length, 3.9-4.3 in total length. Snout 3.6-4.0 in head. Eye
 equal to snout and 0.9-1.1 in interorbital space. Pectoral shorter than head

without snout. Ventral slightly longer than postorbital part of head. Hind margin of preopercle finely serrated. Teeth in a single series in jaws; three pairs of canines anteriorly in the upper jaw, the anteriormost pair vertical and the other two pairs slightly directed outwards; one pair of short canines anteriorly in the lower jaw. A row of elongated scales along the base of dorsal and anal. Lateral line interrupted. Colour: Yellowish to light yellowish green; sides of head and back slightly brownish, lower half of head and chest lighter. A greenish brown band laterally from opercle to caudal peduncle. A black blotch on the upper part of caudal peduncle. Dorsal and anal transparent, brownish basally, a dark spot between last dorsal spine and first three dorsal rays and dark markings on posterior rays of both fins. Dorsal edge of pectoral base blackish.

Distribution: East coast of Africa, Madagascar, Seychelles and Laccadives.

Note: This species closely resembles *C. temmincki* of the Pacific.

366. *Anampses caeruleopunctatus* Rüppell

Anampses caeruleopunctatus Rüppell, Atlas Reise Nordl. Afrika, Fische Rothen Meeres, p. 42, pl. 10, fig. 1, 1828. Day, Fishes of India, p. 395, pl. 87, fig. 4, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 105, 1940. Smith, Fishes of Southern Africa, p. 288, pl. 24, fig. 786, 1949. Jones and Kumaran, Indian J. Fish, 6, pp. 47 and 51, fig. 6, a, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8 p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/307).

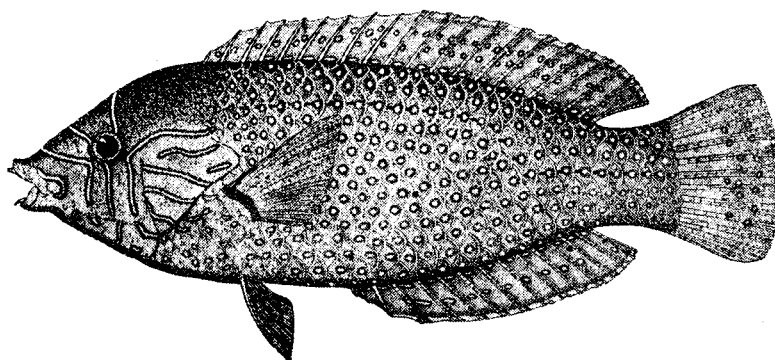


FIG. 366. *Anampses caeruleopunctatus* Rüppell, 153 mm.

Specimens studied: Agathi (4), 98 to 134 mm. Bitra (2), 143 to 147 mm. Chetlat (1), 149 mm. Kadamat (1), 142 mm. Minicoy (4), 150 to 165 mm.

D. IX, 12; A. III, 12; P. ii, 11; V. I, 5. Ll. 28-29; Ltr. 3+1+11.

Head 2.8-3.0 in standard length, 3.3-3.6 in total length. Depth of body 2.6-2.8 in standard length, 3.1-3.3 in total length. Snout about 2.8 in head. Eye 2.5-2.7 in snout and less than 2 in highly convex interorbital space. Teeth in

a single row in jaws, the front two compressed incisors. Pectoral equal to head without snout. Ventral shorter than postorbital part of head. Colour: Reddish brown, scales of body with a bluish spot bordered by narrow dark margin. Head with dark edged bluish bands radiating from eye. Short vertical bands on preopercle and oblique bands on opercle. Dorsal and anal reddish brown or violet with bluish margin and two or three rows of dark edged blue ocelli. Caudal with blue spots and a narrow light border. Axil of pectoral dark. Ventral brownish, the anterior border sometimes blue.

Local names: *Dielahikkae* (Minicoy). *Vayittukadiyan* (other islands).

Distribution: East coast of Africa, Red Sea to the Laccadives, coasts of India, Indonesia, Philippines and Mariana, Society and Christmas Islands.

367. *Anampses amboinensis* Bleeker

Anampses amboinensis Bleeker, Acta Soc. Sci. Indo-Neerl., 2, Achtste Bijdr. vischfauna Amboina, p. 80, 1857. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 103, 1940. Smith, Ichth. Bull., 7, p. 103, 1957. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 302, fig. 22, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/308).

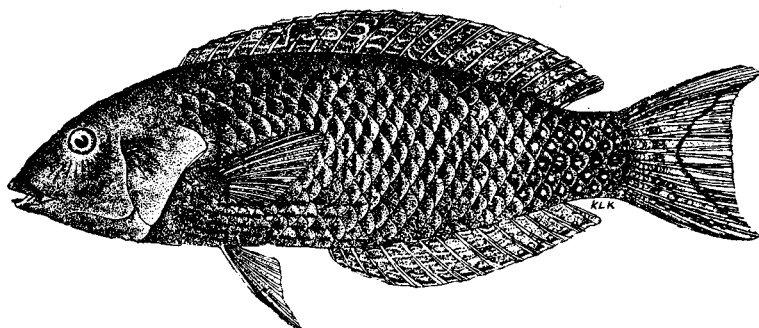


FIG. 367. *Anampses amboinensis* Bleeker, 138 mm. (after Jones and Kumaran)

Specimens studied: Kadamat (1), 138 mm.

D. IX, 12; A. III, 12; P. ii, 11; V. I, 5. Ll. 27-28; Ltr. 3+1+10.

Head 3.1 in standard length, 3.8 in total length. Depth of body 3.2 in standard length, 3.9 in total length. Snout about 3 in head. Eye about 2.4 in snout and 1.8 in convex interorbital space. Teeth in a single row in jaws, the front pair compressed incisors. Pectoral less than head without snout. Ventral with the first ray produced, as long as pectoral. Caudal with outer upper and lower rays slightly produced. Lateral line continuous. Colour: Dark brown with dark indistinct stripes on snout, preopercle, interopercle and opercle. Scales of

body posterior to pectoral with dark vertical stripes and five narrow longitudinal bands below pectoral upto above origin of anal formed by dark stripes or spots on scales. Dorsal and anal brown with three or four rows of light longitudinal streaks bordered with dark and with a black submarginal and a white terminal band. Caudal brown with some black ocelli basally and lighter distally, the two colours sharply defined by a black narrow curved band the ends of which reach the tip of the produced rays. Rays of pectoral brown.

Distribution: Mauritius, Zanzibar, Laccadives, Indonesia and Philippines.

368. *Anampses diadematus* Rüppell

Anampses diadematus Rüppell, Neue Wirbel., Fische Rothen Meeres, p. 21, pl. 8, fig. 3, 1835. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 104, 1940. Smith, Fishes of Southern Africa, p. 288, pl. 54, fig. 785, 1949. Balan, J. Bombay nat. Hist. Soc., 55, p. 303, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/309).

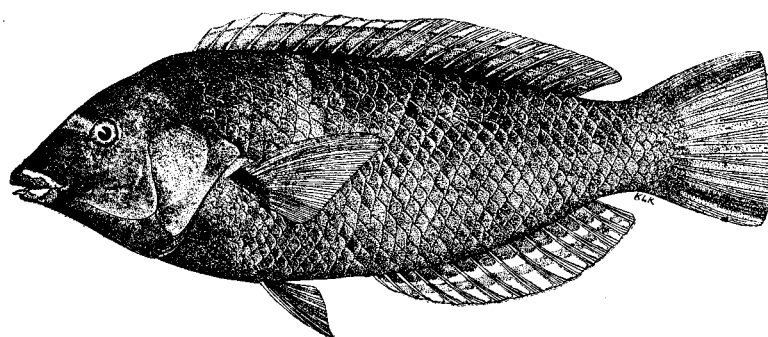


FIG. 368. *Anampses diadematus* Rüppell, 212 mm.

Specimens studied: Ameni (1), 198 mm. Agathi (1), 185 mm. Bitra (4), 167 to 190 mm. Kadamat (1), 212 mm. Kavarathi (7), 202 to 240 mm.

D. IX, 12; A. III, 12; P. ii, 11; V. I, 5. Ll. 27-29; Ltr. 3+1+12.

Head 2.7-2.9 in standard length, 3.2-3.4 in total length. Depth of body 2.7-2.8 in standard length, 3.2-3.3 in total length. Snout 2.8 in head. Eye 2.8-3.1 in snout and equal to two or slightly more in highly convex interorbital space. Small teeth in a single row in jaws, the anterior two in each jaw incisors. Pectoral slightly more than head without snout. Ventral equal to or slightly longer than snout. Colour: Brownish violet with a dark centre for scales. A broad creamy band from anterior border of eye obliquely upwards joining that of the other side over interorbital space. A vertical white band 2 scales wide below 5th or 6th dorsal spine. Dorsal brownish violet with a narrow median light band and

a terminal white band. In small specimens this median band is absent and only light spots and streaks are present. Anal light yellowish with a brown basal band and another brownish median band. Axil of pectoral dark. Outer and median rays of caudal yellowish and the intermediate rays often brown. Ventral pale yellowish with the first three rays light brown.

Local name: *Vayittukadiyan* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, Indonesia, Philippines and Gilbert and Tuamotu Islands.

369. *Cheilio inermis* (Forskål)

Labrus inermis Forskål, Descript. Animal., p. 34, 1775.

Cheilio inermis Day, Fishes of India, p. 407, pl. 88, fig. 4, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 109, fig. 20, 1940. Smith, Fishes of Southern Africa, p. 285, pl. 62, fig. 770, 1949. Munro, Fishes of Ceylon, p. 188, pl. 37, fig. 552, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/310).

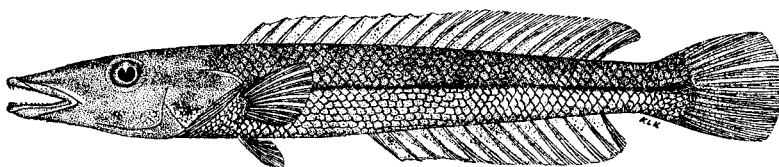


FIG. 369. *Cheilio inermis* (Forskål), 180 mm.

Specimens studied: Agathi (2), 224 and 242 mm. Ameni (2), 81 and 117 mm. Kavarathi (15), 161 to 242 mm. Minicoy (3), 80 to 90 mm.

D. IX, 13-14*; A. III, 12; P. ii, 10; V. I, 5. Ll. 46-49; Ltr. 5 + 1 + 12-13.

* In one specimen, the dorsal count is VIII, 13.

Head 2.8-3.2 in standard length, 3.3-3.7 in total length. Depth of body 7.0-7.5 in standard length, 8.2-8.7 in total length. Snout 2.2-2.3 in head. Eye 3.0-3.8 in snout and about 1.3 in interorbital space. A single series of teeth in jaws, two anteriormost in each jaw canines. Lateral line continuous, smoothly curved. Pectoral rounded and short, 2.8-3.0 in head. Ventral shorter, equal to half length of snout. Colour: Greenish brown above, lighter below, the two colours often separated by a narrow dark longitudinal band from above base of pectoral to caudal. A series of black spots along this band. Dorsal and anal sometimes with indistinct markings. Pectoral and ventral lighter.

Local names: *Iholi* (Minicoy). *Kolas-nhola*, *Nuvachulam* (other islands).

Distribution: East coast of Africa and the Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Taiwan, Ryukyus and Samoan, Society and Hawaiian Islands and Australia.

370. *Gomphosus coeruleus* Lacépède

Gomphosus coeruleus Lacépède, Hist. Nat. Poissons, 3, p. 101, 1802. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 113, 1940. Smith, Fishes of Southern Africa, p. 288, pl. 54, fig. 783, 1949. Munro, Fishes of Ceylon, p. 188, pl. 37, fig. 554, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/311).

Gomphosus caeruleus Day, Fishes of India, p. 406, pl. 88, fig. 3, 1878.

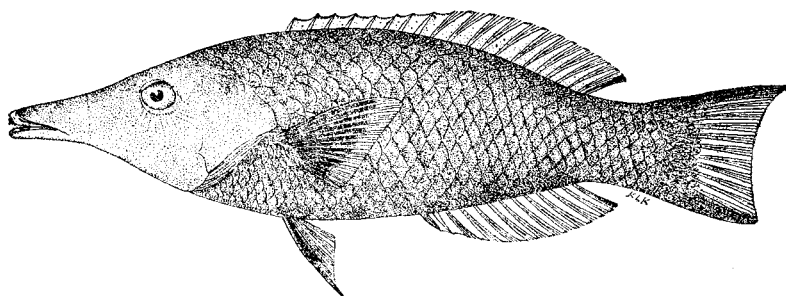


FIG 370. *Gomphosus coeruleus* Lacépède, 140 mm.

Specimens studied: Kavarathi (6), 7 mm. Kiltan (2), 88 and 104 mm. Minicoy (6), 85 to 144 mm.

D. VIII, 12-13; A. III, 10-11; P. ii, 13; V. I, 5. Ll. 26-28; Ltr. 3+1+10.

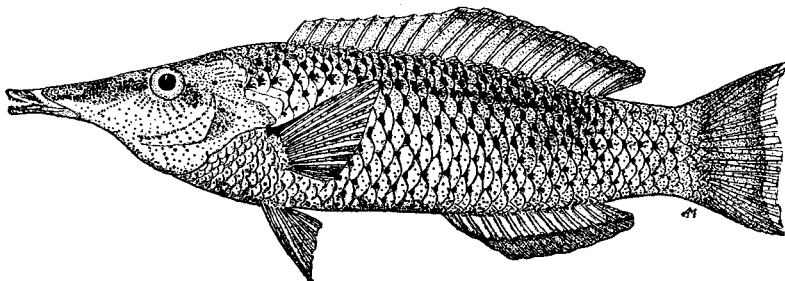
Head 2.3-2.5 in standard length, 2.8-3.0 in total length. Depth of body 3.4-3.7 in standard length, 4.2-4.6 in total length. Snout produced, about 2 in head. Eye 4-5 in snout and about 1.4 in convex interorbital space. A single series of teeth in jaws, the anterior ones caninoid. Pectoral as long as head without snout. Ventral equal to or slightly longer than postorbital part of head. Colour: Dark brown, centre of scales of body darker. Dorsal and anal yellow with narrow blue or brownish edges and the last ray of both fins brown. Caudal yellow with the outer prolonged rays dark brown. Pectoral dark brown with greyish outer border. Ventral lighter, the first ray dark brown.

Local names: *Hibbaruhikkae* (Minicoy). *Chulam*, *Erachichulam* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, coasts of India and Ceylon, Cocos-Keeling Islands, Indonesia, Philippines and New Hebrides.

371. *Gomphosus varius* Lacépède

Gomphosus varius Lacépède, Hist. Nat. Poissons, 3, p. 104, pl. 5, fig. 2, 1802. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 114, fig. 21, 1940. Smith, Fishes of Southern Africa, p. 288, pl. 54, fig. 784, 1949. Munro, Fishes of Ceylon, p. 188, pl. 37, fig. 553, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/312).
Gomphosus pectoralis Day, Fishes of India, p. 406, pl. 86, fig. 6, 1878.

FIG. 371. *Gomphosus varius* Lacépède, 120 mm.

Specimens studied: Agathi (2), 52 and 109 mm. Ameni (4), 60 to 98 mm. Cheflat (4), 60 to 129 mm. Kavarathi (1), 120 mm. Kiltan (3), 48 to 124 mm. Minicoy (15), 35 to 132 mm.

D. VIII, 13; A. (II) III, 11 (17); P. ii, 13; V. I, 5. Ll. 26-29; Ltr. 3+1+9-10.

Head 2.6-2.8 in standard length, 3.0-3.2 in total length. Depth of body 3.8-4.0 standard length, 4.4-4.7 in total length. Snout equal to half length of head. Eye 3.6-4.2 in snout and 1.2 in convex interorbital space. Teeth in a single row in jaws, the anterior ones caninoid. Pectoral as long as head without snout. Ventral equal to postorbital part of head. Colour: Reddish brown, becoming yellowish below. Each scale of body with a dark brown vertical stripe. A dark band on upper part of snout. Two rows of dark spots on posterior part of eye. Dorsal brownish with a narrow white edge. In young specimens a black blotch is present between first and fourth dorsal spines. Anal grey with a dark subterminal longitudinal band and a narrow white edge. Axil of pectoral with a black blotch. Caudal dark brown with a broad white border. Pectoral yellowish to pale. Ventral hyaline, the first ray brownish.

Local names: *Hibbaruhikkae* (Minicoy). *Chulam* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan and Samoan, Society and Hawaiian Islands.

372. *Thalassoma amblycephalus* (Bleeker)

Julis amblycephalus Bleeker, Nat. Tijds. Ned.-Ind., 11, p. 83, 1856. Day, Fishes of India, p. 404, 1878.

Thalassoma amblycephalus Munro, Fishes of Ceylon, p. 190, pl. 38, fig. 563, 1955.

Thalassoma amblycephalus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 136, 1940. Smith and Smith, Fishes of Seychelles, p. 40, pl. 81, G, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/313).

Specimens studied: Minicoy (11), 38 to 50 mm.

D. VIII, 13; A. III, (10) 11; P. ii, 13; V. I, 5. Ll. 27-28; Ltr. $2\frac{1}{2} + 1 + 10$.

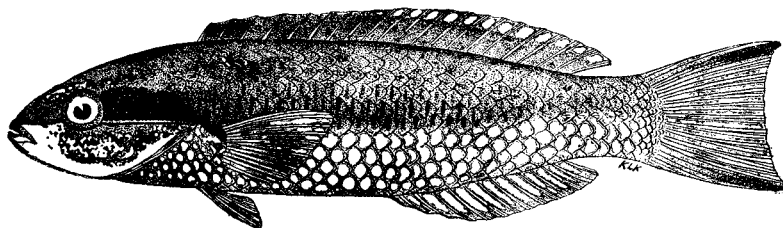


FIG. 372. *Thalassoma amblycephalus* (Bleeker), 48 mm.

Head 3.2-3.3 in standard length, 3.9-4.1 in total length. Depth of body 4.1-4.2 in standard length, 5.1-5.3 in total length. Eye 4.0-4.3 in head, 1.1-1.2 in snout and 0.9-1.0 in convex interorbital space. Teeth in jaws in a single series, anterior pair in each jaw moderate canines. Head naked. Pectoral as long as head without snout. Ventral shorter, as long as snout and eye together. Distal margin of caudal fin concave. Colour: Dorsal half brownish with a dark brown band from interorbital space along mid-dorsal line and becoming obscure below last dorsal rays, lower half of head and body yellowish white, the two colours separated by a dark longitudinal band from snout through eye to base of caudal; scales along this band with darker vertical stripes. Spinous dorsal and basal two third of soft dorsal brown, outer margin white. Anal pale yellowish with a submarginal narrow dusky line. Upper third of base of pectoral black. Caudal pale yellowish, except outer rays which are dusky. Pectoral and ventral yellowish.

Local name: *Bipeng-hikkae* (Minicoy).

Distribution: Seychelles, Laccadives, Ceylon, Indonesia to the Philippines, Ryukyu Islands, New Caledonia, Rotuma, Marshall and Society Islands.

373. *Thalassoma hardwicki* (Bennett)

Sparus hardwickii Bennett, Select. Fish. Ceylon, p. 12, 1830.

Julis dorsalis Day, Fishes of India, p. 403, pl. 85, fig. 7, 1878.

Thalassoma hardwicke Smith, Fishes of Southern Africa, p. 287, pl. 53, fig. 780, 1949.

Thalassoma hardwicki de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 122, fig. 22, 1940. Munro, Fishes of Ceylon, p. 189, pl. 37, fig. 559, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 673, fig. 46, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/314).

Thalassoma hardwickii Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958.

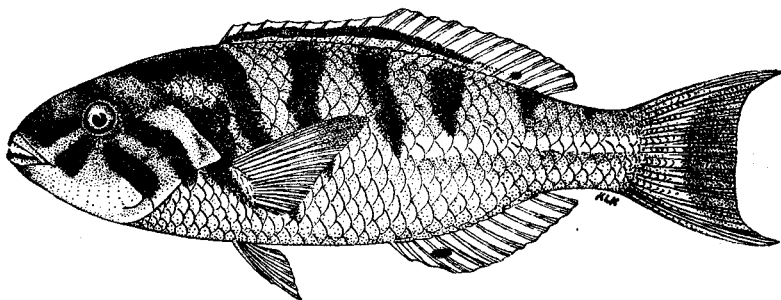


FIG. 373. *Thalassoma hardwicki* (Bennett), 138 mm.

Specimens studied: Agathi (3), 68 to 104 mm. Ameni (4), 48 to 74 mm. Bitra (1), 68 mm. Chetlat (4), 82 to 98 mm. Kadamat (12), 45 to 82 mm. Kalpeni (5), 35 to 105 mm. Kavarathi (5), 48 to 138 mm. Kiltan (1), 87 mm. Minicoy (16), 52 to 143 mm. Suheli (3), 49 to 120 mm.

D. VIII, 12-13; A. II, 10-11; P. ii, 13-14; V. I, 5. Ll. 27-29; Ltr. 3+1+10-11.

Head 3.0-3.2 in standard length, 3.6-4.0 in total length. Depth of body 3.0-3.1 in standard length, 3.7-4.0 in total length. Eye 1.6-2.0 in snout and 1.3-1.6 in convex interorbital space. Teeth in single series in jaws, the anterior two in upper jaw caninoid, 2-4 anterior teeth in lower jaw enlarged. Dorsal spines short, the first less than eye, the last equal to or slightly more than eye. Soft dorsal much higher than spinous part. Pectoral half length of snout shorter than head. Caudal with produced lobes. Lateral line continuous. A few scales on superior parts of opercle. Colour: Greyish blue with six dark transverse bands on sides tapering below. A reddish longitudinal band along side to base of caudal. Head dark violet with four or five broad bands radiating from eye. Base of pectoral dark. Dorsal yellowish with a bluish black longitudinal band. Anal yellowish with a black blotch between anterior rays. Tip of pectoral dusky. Caudal yellowish with the posterior part of median rays dark.

Local names: *Galihikkae* (Minicoy). *Nhola*, *Kuppichulam* (other islands).

Distribution: Tropical Indo-Pacific from the east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Japan and Fiji, Caroline, Society and Tuamotu Islands and Queensland.

374. *Thalassoma janseni* (Bleeker)

Julis (*Julis*) *Janseni* Bleeker, Acta Soc. Sci. Indo-Neerl., 1, p. 56, 1856.

Julis janseni Day, Fishes of India, p. 405, pl. 86, fig. 4, 1878.

Thalassoma janseni de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 119, 1940. Munro, Fishes of Ceylon, p. 189, pl. 37, fig. 556, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/315).

Specimens studied: Agathi (12), 102 to 114 mm. Ameni (3), 38 to 110 mm. Androth (3), 70 to 79 mm. Kadamat (1), 114 mm. Kalpeni (3), 89 to 93 mm. Kavarathi (7), 75 to 134 mm. Minicoy (17), 47 to 119 mm.

D. VIII, 13; A. II-III, 11; P. ii, 13; V. I, 5. Ll. 26-28; Ltr. 3+1+9-10.

Head 3.0-3.4 in standard length, 3.8-4.5 in total length. Depth of body 3.3-3.6 in standard length, 4.0-4.8 in total length. Eye 1.6-2.0 in snout and 1.3-1.6 in convex interorbital space. Teeth in a single series, anterior two in both jaws moderate canines. Lateral line continuous. 3-4 scales on superior part of opercle. Dorsal spines short, soft dorsal higher than spinous part. Outer rays of caudal filamentous in adult. Colour: Pale yellow to creamy white with six wide black vertical bands from back to the sides, the black colour continued on to the dorsal fin. Head dark above and creamy white below. Anal creamy white, often with a dark patch on the last two rays. Pectoral hyaline, the upper rays sometimes dusky. Caudal dusky with a black patch at the base of middle rays in young specimens. Young with three black spots on the dorsal fin; one at the base of the first two spines, the second at the base of the third and fourth dorsal rays and the third at the base of last two rays.

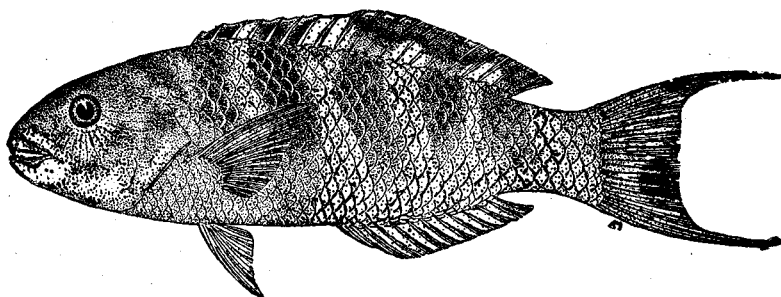


FIG. 374. *Thalassoma janseni* (Bleeker), 119 mm.

Local names: *Galihikkae* (Minicoy). *Nhola* (other islands).

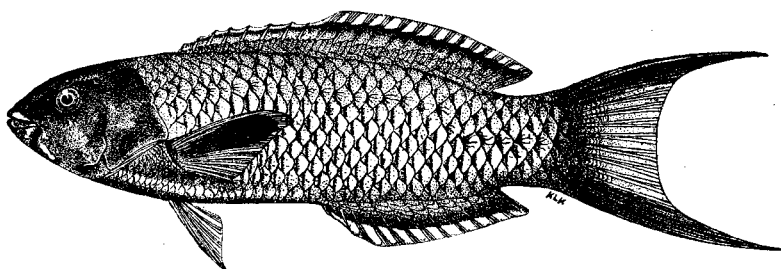
Distribution: Laccadives, coasts of India and Ceylon to the Indonesia, Philippines, New Hebrides, Fiji Islands and Queensland.

375. *Thalassoma lunare* (Linnaeus)

Labrus lunaris Linnaeus, Syst. Nat., ed. 10, p. 283, 1758.

Julis lunaris Day, Fishes of India, p. 403, pl. 86, fig. 1, 1878.

Thalassoma lunare de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 133, 1940 (in part). Smith, Fishes of Southern Africa, p. 287, pl. 53, fig. 777, 1949. Munro, Fishes of Ceylon, p. 190, pl. 38, fig. 561. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958, Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/316).



Specimens studied: Ameni (3), 74 to 90 mm. Kadamat (11), 27 to 88 mm. Kavarathi (1), 119 mm. Kiltan (1), 112 mm. Minicoy (12), 68 to 116 mm. Pitti (4), 105 to 148 mm.

D. VIII, 13(14); A. III, 11; P. ii, 13; V. I, 5. Ll. 27-29; Ltr. 3+1+10.

Head 3.3-3.6 in standard length, 4.5-4.9 in total length. Depth of body 3.3-3.7 in standard length, 4.6-5.1 in total length. Eye about 2 in snout and 1.3-1.5 in convex interorbital space. Teeth in a single series in both jaws with a pair of anterior canines in each. Bases of dorsal and anal fins with scaly sheath. Lateral line continuous. Pectoral slightly more than head without snout. Ventral with the first ray slightly prolonged, equal to postorbital part of head. Colour: Dark green, chin lighter. Operculum sometimes with 3-4 light bands, two oblique bands on lower part of head continued on body, the upper one reaching below pectoral and the lower to above origin of anal. Narrow brown vertical stripes on scales. Dorsal white with a median longitudinal dark brown band. Anal white with a dark brown band. Base of caudal and outer rays of the same dark brown. A longitudinal dark brown blotch on upper half of pectoral.

Local names: *Nagudiguhikkae* (Minicoy). *Nhola*, *Chulam* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China and Solomon Islands, New Hebrides and Australia.

376. *Thalassoma umbrostigma* (Rüppell)

Julis umbrostigma Rüppell, Neue Wirbelt, Fische Rothen Meeres, p. 11, pl. 3, fig. 2, 1835.

Julis purpurea Day, Fishes of India, p. 404, 1878 (synonymy in part).

Thalassoma umbrostigma de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 125, 1940. Smith and Smith, Fishes of Seychelles, p. 40, pl. 81, C, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/317).

Specimens studied: Agathi (1), 103 mm. Bangaram (3), 78 to 132 mm. Kadamat (2), 101 and 108 mm. Kalpeni (5), 62 to 83 mm. Minicoy (13), 112 to 160 mm. Suheli (5), 48 to 175 mm.

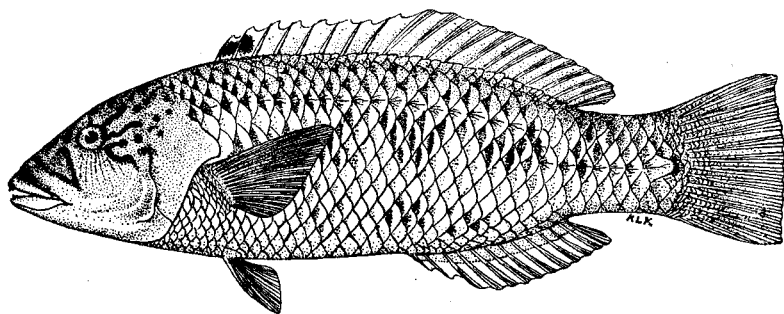


FIG. 376. *Thalassoma umbrostigma* (Rüppell), 150 mm.

D. VIII, 13; A. II-III, 11; P. ii, 14; V. I. 5. Ll. 27-28; Ltr. 3+1+9-10.

Head 3.0-3.3 in standard length, 3.7-4.0 in total length. Depth of body 3.2-3.5 in standard length, 3.8-4.2 in total length. Snout 2.5-2.8 in head. Eye 2.0-2.5 in snout and 1.2-1.5 in convex interorbital space. Teeth in a single series in jaws, anteriormost two in each jaw caninoid. Pectoral equal to or less than head without snout. Ventral much shorter than postorbital length of head. Lateral line continuous. Colour: Body brownish above, pale below. Head greyish with irregular brown stripes and spots. A light band on sides from operculum to upper part of caudal. Some scales above this band dark brown at base, often in 5-6 irregular longitudinal groups. A light band on lower part of side connected to the upper band by 4 or 5 broad light bands separated by 4 or 5 groups of brownish scales. Dorsal and anal pale yellow and often with a reddish brown basal band. A black blotch between 1st and 3rd dorsal spines. Tip of pectoral slightly dusky. Caudal and ventral pale.

Local names: *Hikkae* (Minicoy). *Nhola* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, coasts of India, Indonesia, Philippines and Society, Tuamotu, Marquesas and Hawaiian Islands and Easter Island.

377. *Thalassoma purpurea* (Forskål)

Scarus purpureus Forskål, Descript. Animal., p. 27, 1775.

Julis purpurea Day, Fishes of India, p. 404, pl. 86, fig. 3, 1878 (in part).

Thalassoma purpurea Munro, Fishes of Ceylon, p. 189, pl. 37, fig. 560, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/318).

Thalassoma purpureum de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 127, 1940.

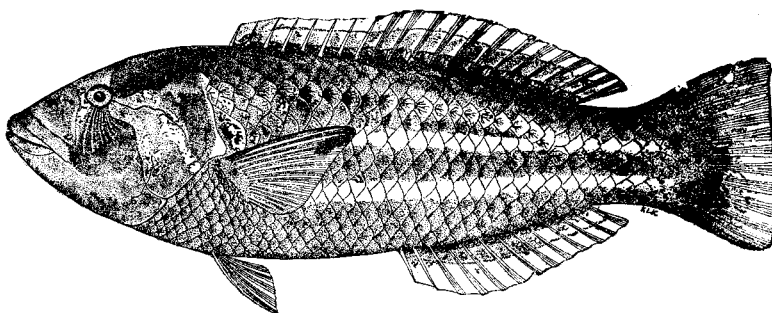


FIG. 377. *Thalassoma purpurea* (Forskål), 211 mm.

Specimens studied: Bitra (1), 193 mm. Chetlat (7), 112 to 240 mm. Mini-coy (6), 138 to 228 mm. Suheli (3), 170 to 245 mm.

D. VIII, 13; A. II-III, 11; P. ii, 14; V. I, 5. Ll. 27-29; Ltr. 3 + 1 + 9-11.

Head 2.8-3.1 in standard length, 3.4-3.9 in total length. Depth of body 2.9-3.2 in standard length, 3.6-3.9 in total length. Snout 2.4-2.7 in head. Eye 2.3-2.8 in snout and 1.4-1.7 in convex interorbital space. Teeth in a single series in jaws, the two anterior ones in both jaws strong and curved canines. Dorsal spines short and the soft dorsal higher than the spinous part. First anal spine minute or sometimes wanting. Lateral line continuous. Three or four scales on upper part of operculum. Pectoral slightly shorter than head without snout. Caudal slightly rounded, often with somewhat produced lobes. Colour: Usually green above, blue below with one brownish-violet band from nape to upper margin of caudal and two purple horizontal bands from behind opercle to caudal base. Head purple with narrow dark triangular mark on snout. A broad pinkish band from behind eye obliquely downwards, bifurcating and ending on subopercular border. Operculum bordered above with a light pinkish band. A pink band along base of pectoral, sometimes joining the lower horizontal band on body. Dorsal fin greenish with a dark median horizontal line and a dark spot present in some between first and third dorsal spines. Anal greenish with a dark sub-basal band and an orange margin. Upper margin and tip of pectoral blackish. Caudal bluish green.

Local names: *Nuhikkae* (Minicoy). *Pattunulan*, *Nhola* (other islands).

Distribution: Widely distributed from the tropical east coast of Africa to the Laccadives, coasts of India, Ceylon, Indonesia and Tahiti, Tuamotu, Hawaiian and Easter Islands.

378. *Thalassoma quinquevittata* (Lay and Bennett)

Scarus quinquevittatus Lay and Bennett, Zool. Beechey's Voyage, p. 66, pl. 19, fig. 3, 1839.

Julis guntheri Bleeker, Versl. Akad. Amsterdam, 13, p. 279, 1862.

Thalassoma guntheri de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 130, 1940.

Thalassoma quinquevittata Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/319).

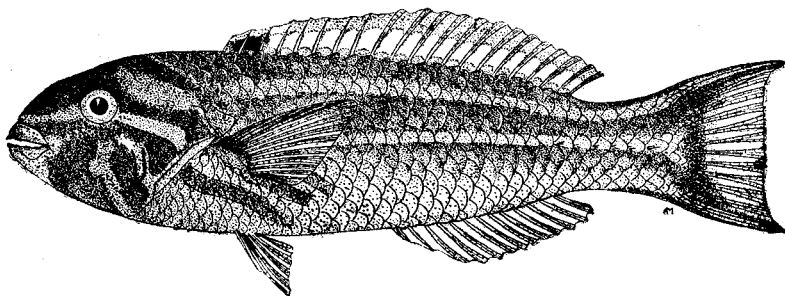


FIG. 378. *Thalassoma quinquevittata* (Lay and Bennett), 117 mm.

Specimens studied: Agathi (1), 90 mm. Kalpeni (1), 80 mm. Kavarathi (1), 105 mm. Minicoy (3), 95 to 120 mm.

D. VIII, 13; A. III, 11; P. ii, 14; V. I, 5. LI. 27-29; Ltr. 3 +1 +9-10.

Head 3.0-3.3 in standard length, 3.6-4.0 in total length. Depth of body 3.4-3.7 in standard length, 4.0-4.4 in total length. Snout 2.8-3.0 in head. Eye 1.5-2.0 in snout and 1.2-1.5 in convex interorbital space. Teeth in a single row in jaws, the front pair moderate canines in each jaw. Pectoral one eye diameter shorter than head. Ventral shorter than postorbital part of head. Lateral line continuous. Colour: Brownish violet, lighter below with two pale to bluish longitudinal bands on sides bordered above and below by blackish. One such band from nape to upper caudal rays and the other from above pectoral to median caudal rays. Five pale bluish to dusky bands radiating from eye; one from dorsal edge of eye to mid-dorsal line, one from posterior border of eye to opercle, sometimes connected posteriorly by an oblique black band from occiput, two from a common origin below eye bifurcating, the first to lower side of head and the second continued on opercle. Two violet bands obliquely downwards from gill opening, one along the base of pectoral and the other parallel to it a little

below pectoral base. Dorsal pale white basally and light brown distally, the two colours well differentiated. A black blotch between first three dorsal spines. Ventral and anal fins pale. Caudal pale yellowish, the upper and lower rays brown or violet. Dorsal edge of base of pectoral blackish, tip of the fin dusky.

Local names: *Nuhikkae* (Minicoy). *Nhola* (other islands).

Distribution: Cape of Good Hope, Red Sea, Laccadives, Indonesia, Philippines and Ryukyu, Mariana, Marshall, Solomon, Samoan, Tuamotu, Fanning and Laysan Islands.

379. *Duymaeria flagellifera* (Valenciennes)

Ctenolabrus flagellifer Cuvier and Valenciennes, Hist. Nat. Poissons, 13, p. 240, 1839.

Duymaeria flagellifera de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 140, fig. 23, 1940. Smith, Fishes of Southern Africa, p. 290, pl. 56, fig. 796, 1949. Smith, Ich. Bull., 7, p. 107, 1957. Smith and Smith, Fishes of Seychelles, p. 38, pl. 28, A, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 390, fig. 11, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 20, 1969 (Cat. No. CMFRI-LA-F. 69/320).

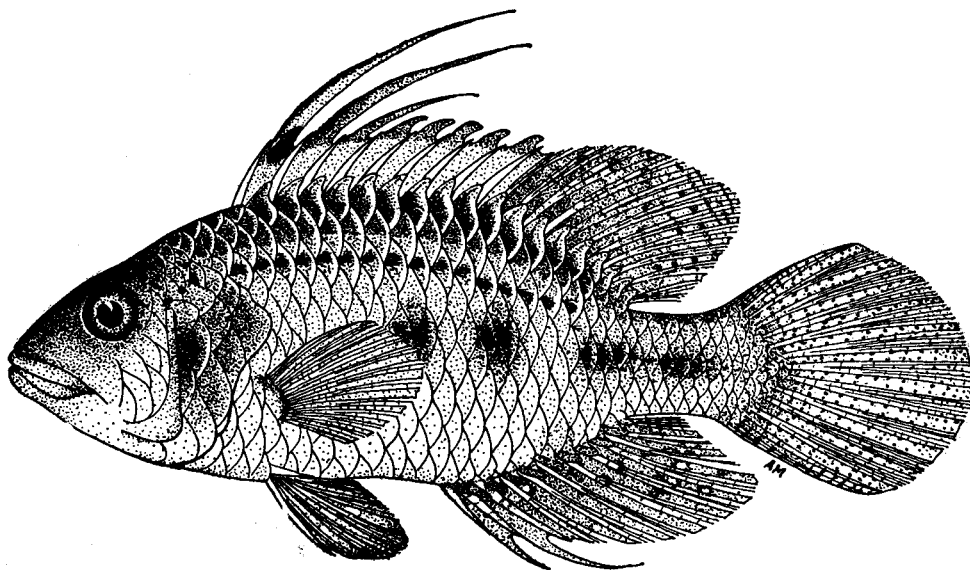


FIG. 379. *Duymaeria flagellifera* (Valenciennes), 87 mm. (after Jones and Kumaran)

Specimen studied: Agathi (1), 87 mm.

D. IX, 11; A. III, 9; P. ii, 11; V. I, 5. Ll. 25; Ltr. 2+1+7.

Head 2.7 in standard length, 3.7 in total length. Depth of body 2.5 in standard length, 3.4 in total length. Eye about 4.8 in head, 1.5 in snout and 1.2 in slightly convex interorbital space. Mouth somewhat protractile, maxillary reaching behind a level from the front border of eye. Teeth in a single series in jaws except anteriorly where there are two irregular rows, two pairs of canines in either jaw near symphysis, the posterior pair longer and curved slightly backwards. Two rows of scales on cheek, preopercular flange naked. Hind border of preopercle denticulated. Dorsal spines rather strong, last spine about twice eye diameter; soft rays longer than spines. Membranes between spines deeply incised and produced into long filaments between first and fourth spines. Third anal spine slightly longer than second, rays longer, membranes between spines incised and produced into filaments. Pectoral slightly shorter than head without snout. Caudal rounded. Lateral line continuous. Colour: Brownish with greenish tinge, becoming lighter below, four brown blotches on sides of body, interorbital space darker, opercle dusky and a few dark spots behind eye. Dorsal pale hyaline with indistinct brownish markings on hind rays and a blackish spot between first and second dorsal spines. Anal pale hyaline with brownish markings posteriorly. Pectoral hyaline. Caudal pale hyaline, with small dark spots on membranes. Ventral greenish basally, pale hyaline distally.

Distribution: East coast of Africa, Seychelles and Laccadives to Malaysia, Indonesia, Philippines, Ryukyus, China, Japan and New Hebrides.

380. *Labroides dimidiatus* (Valenciennes)

Cossyphus dimidiatus Cuvier and Valenciennes, Hist. Nat. Poissons, **13**, p. 136, 1839.

Fissilabrus dimidiatus Smith, Fishes of Southern Africa, p. 291, pl. 63, fig. 805, 1949. Jones and Kumaran, Indian J. Fish., **6**, p. 47, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 671, fig. 42, (1962) 1964.

Labroides dimidiatus Day, Fishes of India, p. 393, pl. 87, fig. 1, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, **8**, p. 148, fig. 25, 1940. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/322).

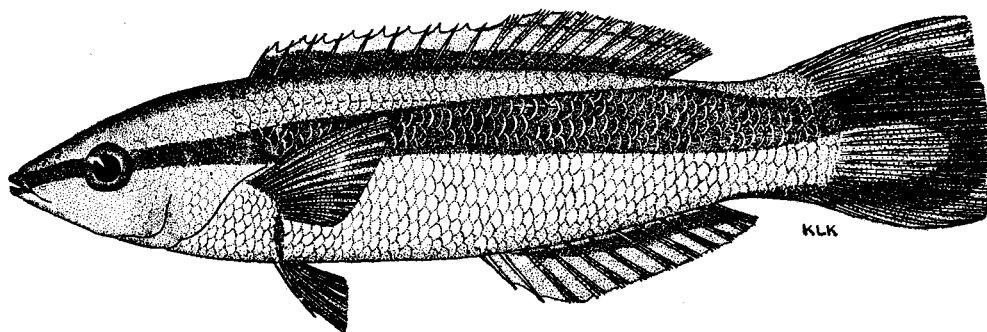


FIG. 380. *Labroides dimidiatus* (Valenciennes), 65 mm.

Specimens studied: Agathi (2), 60 and 62 mm. Ameni (1), 57 mm. Chetlat (4), 24 to 68 mm. Kadamat (2), 53 and 58 mm. Kavarathi (1), 43 mm. Kiltan (1), 37 mm. Minicoy (14), 18 to 75 mm.

D. IX, 10-11; A. III, 10; P. ii, 11; V. I, 5. Ll. 50-54; Ltr. 4 + 1 + 12-13.

Head 3.1-3.5 in standard length, 3.8-4.2 in total length. Depth of body 4.2-4.6 in standard length, 5.2-5.5 in total length. Snout 3.4-3.5 in head. Eye 1.5-1.6 in snout and about 1.3 in convex interorbital space. Upper lip slightly fleshy and the lower lip separated into two lobes by a median frenulum. Teeth in a single row in jaws of which two in front are canines and 2 or 3 irregular rows near symphysis. A canine at corner of mouth. Lateral line continuous. Colour: Bluish brown on back and pinkish or white below. A bluish black band from snout through eye to the end of caudal, broader on the posterior part of body, curving down at end of caudal fin and continued forward along lower part of caudal peduncle. A bluish black streak from lower edge of base of pectoral towards ventral. Basal part of dorsal bluish black, distal part whitish. Anal pale to white with a dark brown basal part. Pectoral and ventral yellowish.

Local name: *Haremkali* (Minicoy).

Distribution: East coast of Africa and Red Sea to the Laccadives, coasts of India, Indonesia, Philippines, New Hebrides, Queensland and Samoan, Society and Hawaiian Islands.

381. *Hemigymnus fasciatus* (Bloch)

Labrus fasciatus Bloch, Naturges. Ausland. Fische, 6, p. 6, pl. 290, 1792.

Hemigymnus fasciatus Day, Fishes of India, p. 396, 1878. de Beaufort Fishes of the Indo-Australian Archipelago, 8, p. 143, 1940. Smith, Fishes of Southern Africa, p. 288, pl. 61, fig. 787, 1949. Munro, Fishes of Ceylon, p. 191, pl. 38, fig. 565, 1955. Smith and Smith, Fishes of Seychelles, p. 38, pl. 28, I, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/519).

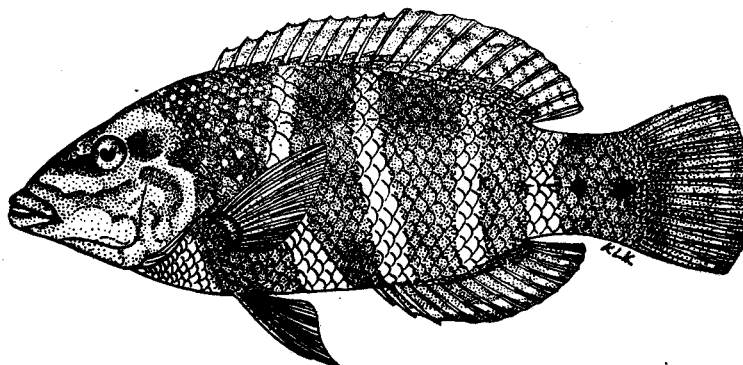


FIG. 381. *Hemigymnus fasciatus* (Bloch), 135 mm.

Specimen studied: Minicoy (1), 135 mm.

D. IX, 11; A. III, 11; P. ii, 12; V. I, 5. Ll. 19+7; Ltr. 5+1+12.

Head 2.7 in standard length, 3.4 in total length. Depth of body 2.6 in standard length, 3.3 in total length. Eye 6.5 in head, 2.6 in snout and 1.6 in interorbital space. Lips thick, lower lip notched. Teeth in a single series in jaws, the anterior pair in each jaw canines. Cheeks with three rows of thin imbedded scales. Dorsal spines increasing in length posteriorly, rays higher than spinous dorsal. Pectoral equal to head without snout. Ventral slightly shorter than pectoral. Colour: Dark brown; head and breast in front of bases of pectoral and ventral yellowish; sides with four yellowish transverse bars. A dark spot behind eye. Head with dark streaks. Four or five dark spots posteriorly on body. Dorsal fin brown with dark border and with dark oblique streaks between rays. Anal brown with dark border. Caudal dark brown. Pectoral yellowish with dark base. Ventral dark brown.

Distribution: East coast of South Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan and Ryukyu, Caroline and Marshall Islands.

382. *Hemigymnus melapterus* (Bloch)

Labrus melapterus Bloch, Naturges. Ausland. Fische, 5, p. 137, pl. 285, 1791.

Hemigymnus melapterus Day, Fishes of India, p. 396, pl. 84, fig. 2, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 145, fig. 24, 1940. Smith, Fishes of Southern Africa, p. 289, fig. 788, 1949. Smith and Smith, Fishes of Seychelles, p. 38, pl. 28, J, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/321).

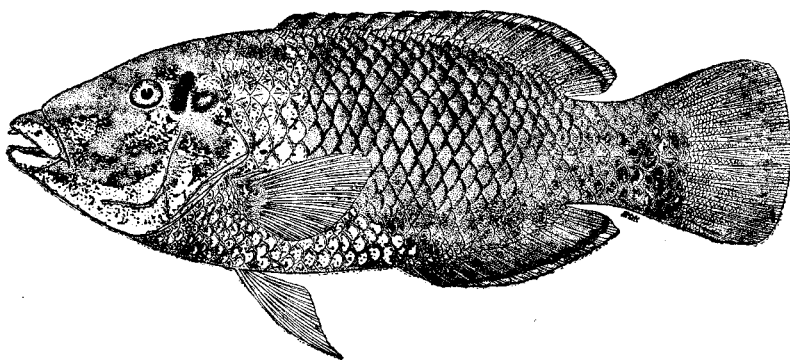


FIG. 382. *Hemigymnus melapterus* (Bloch), 218 mm.

Specimen studied: Bitra (1), 218 mm.

D. IX, 11; A. III, 11; P. ii, 12; V. I, 5. Ll. 28; Ltr. 5+1+13.

Head equal to depth of body, 2.8 in standard length, 3.4 in total length. Eye 7.6 in head, 3.7 in snout and 1.8 in convex interorbital space. Lips very thick, the lower notched in the middle. Teeth conical, in a single series in jaws; two almost horizontal canines anteriorly in each jaw. Cheek with three rows of imbedded scales. Soft dorsal higher than spinous dorsal. Pectoral and ventral subequal, shorter than snout and eye together. Colour: Head and body upto origin of second spine of dorsal pale yellowish, rest of body and tail dark brown. Head with pale bands and an irregular black blotch behind eye. Dorsal and anal brown with submarginal dark brown band and with narrow dark brown edge. Caudal brown with some darker spots distally. Pectoral and ventral pale yellowish.

Local name: *Thokka* (Bitra).

Distribution: East coast of South Africa to the Laccadives, coasts of India, Andamans, Indonesia, Philippines, Indo-China and Rykyu, Palau, Caroline, Gilbert, Solomon and Samoan Islands and Australia.

383. *Macropharyngodon meleagris* (Valenciennes)

Julis meleagris Valenciennes, Hist. Nat. Poissons, 13, p. 481, 1839.

Macropharyngodon meleagris de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 172, fig. 31, 1940. Balan, J. Bombay nat. Hist. Soc., 55, p. 303, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/323).

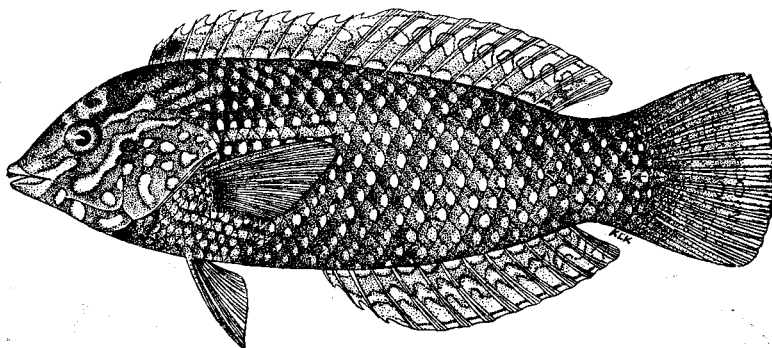


FIG. 383. *Macropharyngodon meleagris* (Valenciennes), 72 mm.

Specimens studied: Ameni (1), 65 mm. Kadamat (1), 110 mm. Kavarathi (1), 95 mm. Minicoy (5), 35 to 72 mm.

D. IX, 11; A. III, 11; P. ii, 10; V. I, 5. Ll. 27-29; Ltr. 2+1+9.

Head 3.1-3.3 in standard length, 3.7-3.9 in total length. Depth of body 2.9-3.1 in standard length, 3.5-3.7 in total length. Teeth in a single series in

jaws. Two pairs of canines in jaws; the anterior pair in upper jaw directed obliquely forwards and the posterior pair curved backwards; canines in lower jaw directed forwards. A canine at corner of mouth. Pectoral longer than postorbital part of head. Lateral line continuous. Colour: Generally pinkish brown. Head somewhat violet with yellowish bands and spots bordered by brown. Two bands from eye to interorbital space and another posterior to these two. One band from eye to corner of mouth. An oblique band on preopercle passing below eye to upper part of opercle. A curved band on opercle and a few spots on cheek. Central part of scales brown and posterior part light and hence the body appears spotted and sometimes with longitudinal bands anteriorly. A blue-black spot at isthmus. Dorsal and anal light with a narrow submarginal brown line. A dark blotch between 1st and 3rd dorsal spines. Dorsal with a row of semi-circular light blotches, with brown edges along the base and a row of oblong spots in the middle, sometimes uniting to form a wavy band. A black blotch between 8th and 10th dorsal rays in young specimens. Anal with semicircular spots at the base and an undulating band in the middle. A brown patch at the base of pectoral. Dorsal and ventral edge of caudal brownish, rest of the fin lighter with 5-6 rows of spots edged brown.

Distribution: Laccadives in the Indian Ocean and from Indonesia to the Philippines and Ryukyu, Samoan, Solomon, Caroline and Society Islands.

384. *Halichoeres scapularis* (Bennett)

Julis scapularis Bennett, Proc. Zool. Soc. London, 1, p. 167, 1831.

Guntheria scapularis Munro, Fishes of Ceylon, p. 191, pl. 38, fig. 567, 1955.

Halichoeres scapularis de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 186, 1940. Smith, Fishes of Southern Africa, p. 290, pl. 55, fig. 795, 1949. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/324).

PlatyGLOSSUS scapularis Day, Fishes of India, p. 400, pl. 85, fig. 4, 1878.

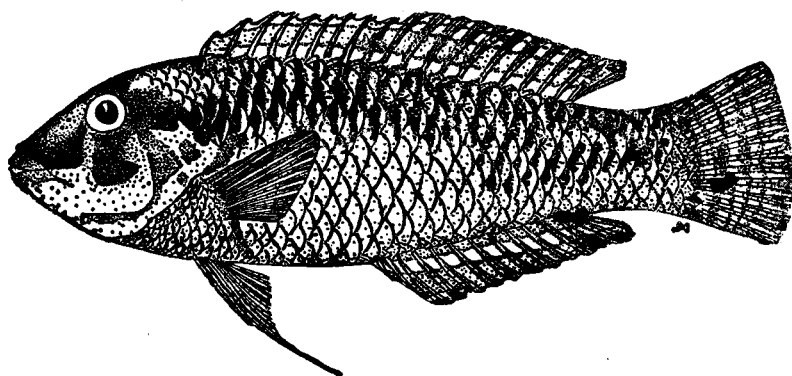


FIG. 384. *Halichoeres scapularis* (Bennett), 127 mm.

Specimens studied: Agathi (3), 72 to 108 mm. Ameni (6), 106 to 128 mm. Androth (4), 91 to 119 mm. Bitra (8), 85 to 145 mm. Kadamat (3), 85 to 96 mm. Kalpeni (3), 100 to 116 mm. Kavarathi (4), 108 to 120 mm. Minicoy (11), 53 to 109 mm.

D. IX, 11; A. III, 11; P. ii, 12; V. I, 5. Ll. 27-28; Ltr. 3+1+8-9.

Head 2.9-3.3 in standard length, 3.6-4.0 in total length. Depth of body 3.1-3.4 in standard length, 3.7-4.1 in total length. Snout 2.5-2.8 in head. Eye 2.2-2.6 in snout and 1.3-1.5 in convex interorbital space. Two pairs of canines in the upper jaw, the anterior pair longer and forwardly directed, the other pair curved outwards and backwards. Two canines in the lower jaw directed forwards. A canine at corner of mouth. Pectoral shorter than head without snout. Ventral, with the first ray produced, exceeding the length of head without snout. Colour: Head darker above with a broad blue area between eye and upper lip and another below the eye passing obliquely on to the opercle. One or two brownish violet patches posterior to eye continued on to the lateral line as an irregular broad band. 4-5 rows of scales on the upper half with blue vertical stripes. A creamy white patch above the origin of lateral line. Dorsal with a bluish subterminal and terminal bands and anal with a subterminal band. Caudal with 4-5 violet transverse bands.

Local names: *Dong-hikkae* (Minicoy). *Vayittukadiyan* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, New Hebrides, Samoan Islands and south to Australia.

385. *Halichoeres centriquadrus* (Lacépède)

Labrus centriquadrus Lacepede, Hist. Nat. Poissons, 3, pp. 437 and 493, 1802.

Halichoeres centriquadrus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 189, 1940. Balan, J. Bombay nat. Hist. Soc., 55, p. 303, 1958.

Halichoeres centriquadrus Smith, Fishes of Southern Africa, p. 290, pl. 56, fig. 793, 1949. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/325).

Hemitautoga centriquadrus Munro, Fishes of Ceylon, p. 192, pl. 38, fig. 568, 1955.

PlatyGLOSSUS hortulanus Day, Fishes of India, p. 399, pl. 85, fig. 3, 1878.

Specimens studied: Agathi (2), 145 and 173 mm. Ameni (1), 143 mm. Bitra (4), 128 to 195 mm. Kalpeni (3) 88 to 160 mm. Kiltan (7), 117 to 150 mm. Minicoy (8), 103 to 185 mm.

D. IX, 11; A. III, 11; P. ii, 12; V. I, 5. Ll. 26-27; Ltr. 3+1+9.

Head 2.9-3.1 in standard length, 3.6-3.8 in total length. Depth of body 2.8-3.2 in standard length, 3.5-3.9 in total length. Snout 2.4-2.7 in head. Eye 2.2-2.7 in snout and 1.4-1.7 in the highly convex interorbital space. Teeth in

a single row in jaws. Canines in lower jaw directed forwards. Anterior pair of canines in the upper jaw directed forwards and the posterior pair curved outwards and backwards. A canine at corner of mouth. Pectoral equal to or more than length of head without snout. First ray of ventral produced. Lateral line continuous. Colour: Brown above and yellowish below. Scales of body excepting under sides of pectoral, belly and below the creamy patch of dorsal with a brownish vertical stripe. Some oblique bluish bands on head. A creamy white area around the base of fourth dorsal spine and an elongate black blotch behind upto eighth spine, these colours extending below the fin on body. Dorsal and anal creamy white. Oblique bluish bands with dark margins on dorsal. Axil of pectoral black. Caudal often with pale vertical bands.

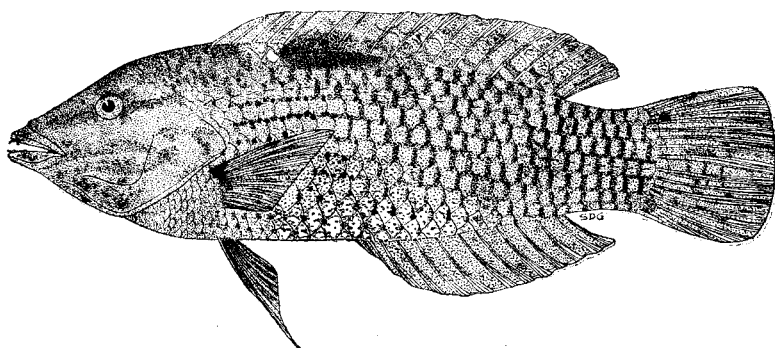


FIG. 385. *Halichoeres centriquadrus* (Lacépède), 160 mm.

Local names: *Kunauhikkae* (Minicoy). *Nhola*, *Payathalayan* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Taiwan and Guam, Gilbert and Society Islands.

386. *Halichoeres marginatus* Rüppell

Halichoeres marginatus Rüppell, Neue Wirbelt., Fische Rothen Meeres, p. 16, 1835.

Halichoeres marginatus Day, Fishes of India, p. 398, pl. 84, fig. 5, 1878 (in part). de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 197, 1940. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/326).

PlatyGLOSSUS marginatus Munro, Fishes of Ceylon, p. 192, pl. 38, fig. 570, 1955.

Specimens studied: Agathi (1), 138 mm. Ameni (4), 88 to 105 mm. Androth (3), 90 to 105 mm. Kalpeni (2), 82 and 84 mm. Kavarathi (7), 80 to 115 mm. Kiltan (4), 78 to 92 mm. Minicoy (6), 87, to 130 mm.

D. IX, 13; A. III, 12; P. ii, 12; V. I, 5. Ll. 27-29; Ltr. 3+1+10.

Head 3.4-3.7 in standard length, 4.1-4.5 in total length. Depth of body 2.6-2.9 in standard length, 3.2-3.5 in total length. Snout 3.2-3.4 in head. Eye

1.5-2.0 in snout and 1.2-1.5 in interorbital space. Teeth in a single row in jaws, the anterior pair in each jaw canines. A canine at corner of mouth. Lateral line continuous. Pectoral and ventral subequal, one eye diameter shorter than head. Colour: Variable; usually greenish black with dark centre for each scale. A green band from snout to eye and another from upper lip to eye. Two oblique bands sometimes present from hind border of eye to upper side of operculum. One band from chin to operculum. Three or four irregular light bands on preopercle and opercle. Dorsal and anal dark violet with numerous light ocelli and often a longitudinal green subterminal band and white outer margin. A dark violet crescent shaped broad area in the middle of the caudal with light ocelli, often a green band posterior to the crescent mark and a lighter border. Basal half of pectoral black, distal half whitish. Ventral grey.

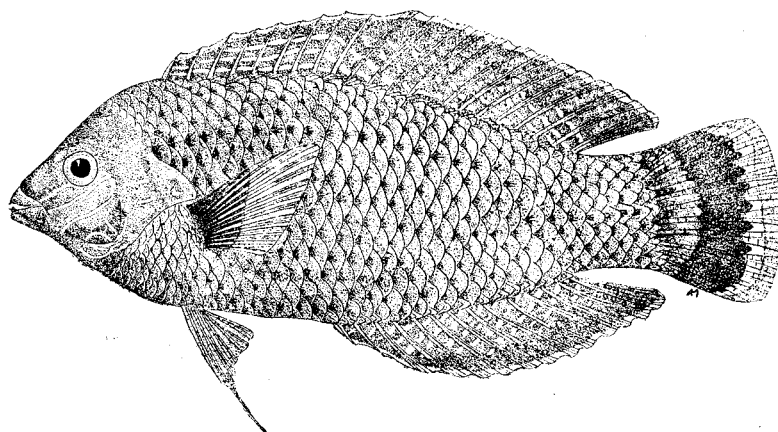


FIG. 386. *Halichoeres marginatus* Rüppell, 123 mm.

Distribution: Red Sea, Seychelles, Laccadives, India, Ceylon, Indonesia to the Philippines and Samoan, Society and Marquesas Islands.

387. *Halichoeres notopsis* (Valenciennes)

Julis notopsis Valenciennes, Hist. Nat. Poissons, 13, p. 485, 1839.

Halichoeres notopsis de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 199, 1940. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/327).

PlatyGLOSSUS notopsis Day, Fishes of India, p. 398, pl. 84, fig. 4, 1878. Munro, Fishes of Ceylon, p. 192, pl. 38, fig. 569, 1955.

Specimens studied: Agathi (10), 12 to 72 mm. Androth (5), 38 to 70 mm. Bitra (5), 53 to 62 mm. Chetlat (24), 20 to 68 mm. Kadamat (1), 45 mm. Kalpeni (1), 45 mm. Kavarathi (7), 26 to 33 mm. Kiltan (12), 29 to 98 mm. Minicoy (4), 35 to 75 mm.

D. IX, 13; A. III, 12; P. ii, 12; V. I, 5. Ll. 27-29; Ltr. 3 + 1 + 10.

Head 3.2-3.4 in standard length, 3.9-4.2 in total length. Depth of body 2.7-2.9 in standard length, 3.3-3.5 in total length. Snout 3.2-3.4 in head. Eye 1.3-1.6 in snout and about 1.2 in convex interorbital space. Teeth in a single row, the front pair in each jaw canines. A canine at corner of mouth. Pectoral slightly longer than head without snout. Ventral equal to or slightly longer than postorbital part of head. Colour: Purplish brown with a dark spot for each scale. Dorsal brown with three or four longitudinal or slightly oblique light bands or streaks and a narrow white margin. A small black ocellus between 1st and 2nd dorsal spines and a large black ocellus surrounded by white usually between 2nd and 5th dorsal rays. Anal with four longitudinal or oblique lighter bands or streaks. Caudal brown with white distal margin. Ventral brownish. Young greenish brown with five or six broad dark brown bands on head and body. Dorsal with a black spot between first and second spines and a large blotch anteriorly on soft dorsal. Dorsal and anal with light blotches.

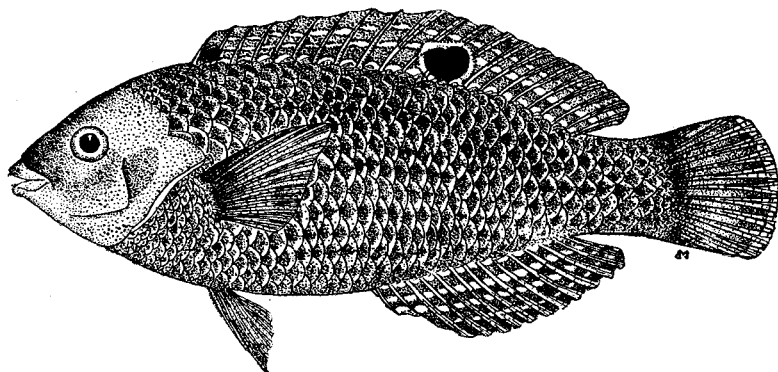


FIG. 387. *Halichoeres no1opsis* (Valenciennes), 98 mm.

Distribution: Seychelles, Laccadives, India, Ceylon, Indonesia to the Philippines and Guam, New Hebrides, Palau and Society Islands and Queensland.

388. *Halichoeres kawarin* (Bleeker)

Julis (*Halichoeres*) *kawarin* Bleeker, Nat. Tijds. Ned.-Ind., 3, p. 172, 1852.

Halichoeres kawarin de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 227, 1940. Smith, Fishes of Southern Africa, p. 507, pl. 55, fig. 792, a, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/328).

PlatyGLOSSUS kawarin Day, Fishes of India, p. 400, 1878.

Specimens studied: Agathi (5), 38 to 51 mm. Ameni (3), 55 to 78 mm. Androth (2), 66 and 76 mm. Bitra (11), 21 to 76 mm. Chetlat (14), 28 to 66 mm. Kavarathi (1), 40 mm. Minicoy (13), 52 to 82 mm.

D. IX, 11; A. III, 10-11; P. ii, 11; V. I, 5. Ll. 27-29; Ltr. ♂+1+8.

Head 3.0-3.2 in standard length, 3.6-3.8 in total length. Depth of body 3.1-3.4 in standard length, 3.8-4.2 in total length. Snout 3.0-3.3 in head. Eye 1.6-1.8 in snout and about 1.2 in almost flat interorbital space. Teeth pointed, anterior pair in both jaws moderate canines; a canine at corner of mouth. Pectoral shorter than head without snout. Ventral with the first ray produced, equal to pectoral. Caudal rounded. Lateral line continuous. Colour: Bluish green above, yellowish below. Head with an oblique bluish band from upper lip to eye, light bluish bands between occiput and upper part of snout, a bluish black vertical streak posterior to the eye and an oblique bluish band on cheek and another on the opercle. An oblique streak before base of pectoral and another posterior to its base. Three or four streaks on the anterior part of body continued as two irregular blotches, one between dorsal and anal and the other on caudal peduncle. Spinous dorsal white with indistinct markings, soft dorsal with two rows of greyish rings and often a large blotch between 1st to 4th rays. Anal dusky with a median band. Caudal with some vertical streaks. Pectoral and ventral hyaline.

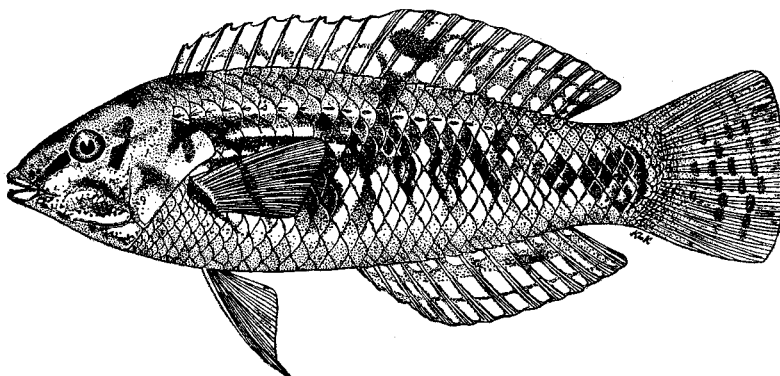


FIG. 388. *Halichoeres kawarin* (Bleeker), 78 mm.

Local names: *Rybanduhikkae* (Minicoy). *Nhola* (other islands).

Distribution: East coast of Africa, Laccadives, Andamans to Indonesia, Philippines and Gilbert, Samoan and Society Islands.

389. *Halichoeres argus* (Bloch and Schneider)

Labrus argus Bloch and Schneider, Syst. Ichth., p. 263, 1801.

Halichoeres argus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 230, fig. 34, A, 1940. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 303, fig. 23, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/329).

Specimen studied: Kadamat (1), 77 mm.

D. IX, 12; A. III, 12; P. ii, 12; V. I, 5. Ll. 28; Ltr. 2+1+9.

Head 3.1 in standard length, 3.7 in total length. Depth of body 3.0 in standard length, 3.6 in total length. Snout about 3.2 in head. Eye 1.7 in snout and 1.2 in slightly convex interorbital space. Teeth somewhat conical, in a single row in jaws, a pair of canines anteriorly in each jaw. A canine at corner of mouth. Pectorals shorter than head without snout. Ventral with the first ray produced, slightly longer than pectoral. Lateral line continuous. Colour: Light pinkish, body reticulated. A dark band from upper lip to eye and another from chin to below eye, bifurcating, one branch vertically behind the eye and the other downwards over preopercle and opercle. A dark bar on the upper part of opercle and an elongate dark blotch below this. Scales above lateral line with a dark centre excepting one scale each below 5th and 8th dorsal spines, 4th and 9th dorsal rays and posterior to the base of the last dorsal ray. Body below the lateral line with a reticulated appearance. Dorsal dark brown with three rows of light ocelli. Anal brown with a row of light spots basally, a median longitudinal light band and a row of small light ocelli distally. Caudal yellowish, distal portion dark. Ventral hyaline, membrane between first and second rays dark.

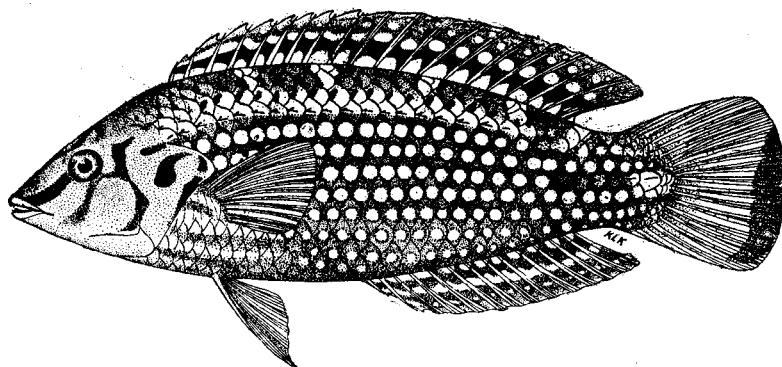


FIG. 389. *Halichoeres argus* (Bloch and Schneider), 77 mm. (after Jones and Kumaran)

Local name: *Nhola* (Kadamat).

Distribution: Laccadives and from Indonesia to the Philippines, Indo-China, China, New Hebrides, North Australia and Fiji.

390. *Stethojulis axillaris* (Quoy and Gaimard)

Julis axillaris Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 272, 1824.

Stethojulis axillaris de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 167, fig. 28, 1940. Smith, Fishes of Southern Africa, p. 291, pl. 57, fig. 800, 1949. Munro, Fishes of Ceylon, p. 191, pl. 38, fig. 566, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 672, fig. 44, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/330).

Specimens studied: Agathi (7), 45 to 68 mm. Ameni (11), 37 to 80 mm. Androth (8), 41 to 63 mm. Bitra (5), 29 to 57 mm. Chetlat (16), 30 to 63 mm. Kadamat (17), 45 to 74 mm. Kavarathi (4), 41 to 82 mm. Kiltan (1), 90 mm. Minicoy (74), 34 to 92 mm.

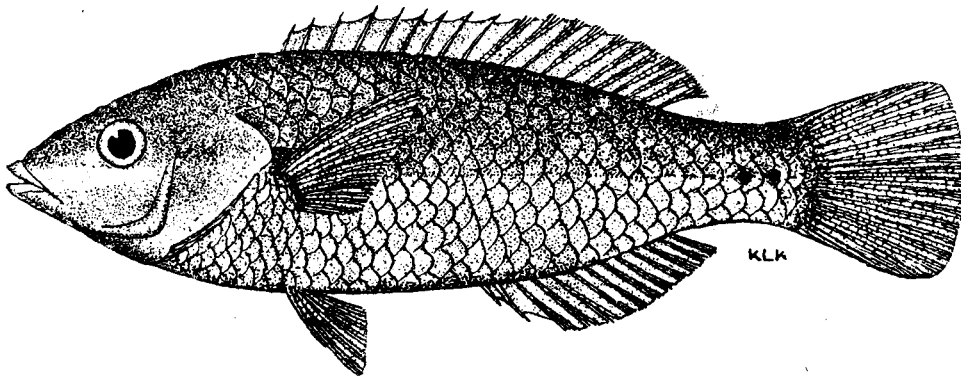


FIG. 390. *Stethojulis axillaris* (Quoy and Gaimar), 75 mm.

D. IX, 11; A. II-III, 10-11; P. ii, 12; V. I, 5. Ll. 26-27; Ltr. 2 + 1 + 9-10.

Head 2.9-3.2 in standard length, 3.5-3.9 in total length. Depth of body 2.9-3.2 in standard length, 3.5-4.0 in total length. Eye 1.6-2.2 in snout and 1.2-1.4 in convex interorbital space. A single row of teeth in jaws. A short canine at angle of mouth. Lateral line continuous. Dorsal spines small and slender, the first spine less than diameter of eye and the last about an eye diameter and a half. Dorsal rays slightly longer than the last spine. Pectoral equal to head without snout. Caudal rounded. Colour: Brownish with reddish tinge above, silvery below. A triangular creamy red spot in axil of pectoral. Two or three indistinct orange streaks from snout to opercular margin. A lateral band sometimes present with two or three blue edged black ocelli on caudal peduncle. Fins hyaline. In young specimens, a black spot anteriorly on mid-dorsal line of snout and another between last two dorsal rays.

Local names: *Hikkae* (Minicoy). *Nhola* (other islands).

Distribution: East coast of Africa and Red Sea to the Laccadives, Indonesia, Philippines, Japan and Marshall, Hawaiian, Tuamotu and Marquesas Islands and Queensland.

391. *Stethojulis phekadopleura* (Bleeker)

Julis (*Halichoeres*) *phekadopleura* Bleeker, Verh. Nat. Gen., 22, Bijdr. Ichth. Bali, p. 8, 1849.

Stethojulis phekadopleura de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 164, 1940. Smith, Ichth. Bull., 7, p. 107, 1957. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 304, fig. 24, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/331).

Specimens studied: Agathi (6), 53 to 83 mm. Androth (3), 48 to 49 mm. Chetlat (5), 20 to 57 mm. Kadamat (1), 75 mm. Kavarathi (28), 22 to 99 mm. Kiltan (23), 31 to 63 mm. Minicoy (18), 40 to 89 mm. Pitti (1), 47 mm.

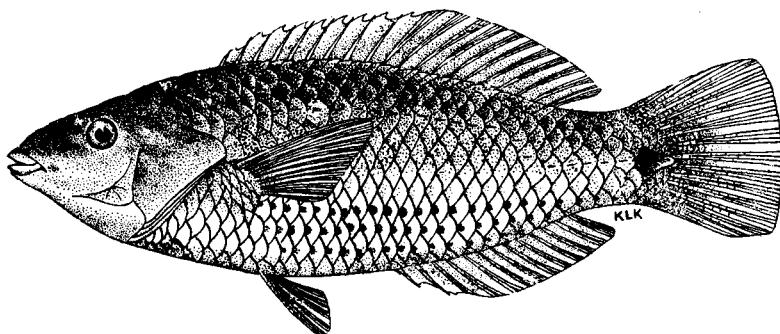


FIG. 391. *Stethojulis phekadopleura* (Bleeker), 96 mm. (after Jones and Kumaran)

D. IX, 11; A. III, 11; P. ii, 11; V. I, 5. Ll. 27-28; Ltr. 2+1+9.

Head 3.0-3.3 in standard length, 3.6-3.9 in total length. Depth of body 3.0-3.4 in standard length, 3.6-3.9 in total length. Snout about 2.8 in head. Eye 1.8-2.2 in snout and 1.2-1.4 in slightly convex interorbital space. Teeth in a single row in both jaws; a canine at corner of mouth. Lateral line continuous. Pectoral equal to head without snout. Ventral much shorter than postorbital length of head. Colour: Reddish brown above with greyish tinge, creamy white below, the two colours well defined. Often a narrow line below eye. Upper sides of head and body with light brown spots. Three longitudinal rows of scales from below pectoral to above end of anal fin with brown spots. Usually a large brown spot at the end of lateral line. Fins hyaline.

Local names: *Hikkae* (Minicoy). *Nhola* (other islands).

Distribution: Coast of Natal, Laccadives, Indonesia, Philippines, Japan and Caroline, Solomon, New Hebrides, Fiji and Samoan Islands.

392. *Stethojulis strigiventer* (Bennett)

Julis strigiventer Bennett, Proc. Zool. Soc. London, p. 184, 1832.

Stethojulis strigiventer Day, Fishes of India, p. 397, pl. 84, fig. 7, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 163, 1940. Smith, Fishes of Southern Africa, p. 291, pl. 57, fig. 801, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/332).

Specimens studied: Agathi (15), 38 to 84 mm. Ameni (1), 48 mm. Bitra (24), 39 to 87 mm. Chetlat (1), 65 mm. Kavarathi (1), 64 mm. Minicoy (28), 30 to 79 mm. Suheli (14), 55 to 90 mm.

D. IX, 11; A. III, 11; P. ii, 13; V. I, 5. Ll. 27-28; Ltr. 2+1+9.

Head 2.8-3.0 in standard length, 3.4-3.7 in total length. Depth of body 3.4-3.6 in standard length, 4.1-4.4 in total length. Snout 3 in head. Eye 1.7-2.0 in snout and 1.2-1.4 in interorbital space. Pectoral as long as or slightly less than head without snout. Colour: Light reddish brown above and lighter below. A silvery band edged by dark above from snout, along lower border of eye to upper part of opercle. Five or six light silvery bands on lower half of sides formed by silvery dots on scales from thorax to above end of anal fin. Scales on lower part with dark spots. A brown spot at base of supra-median caudal rays and sometimes another on last rays of dorsal. Young specimens often with a brown spot at base of last anal rays.

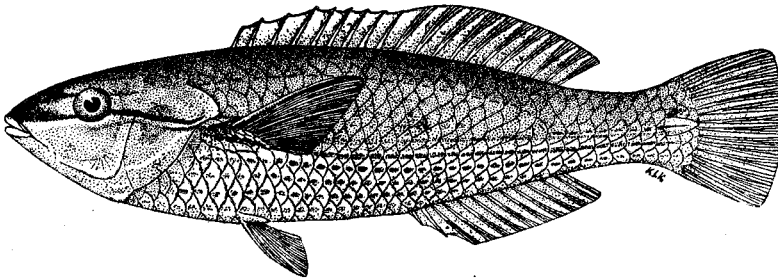


FIG. 392. *Stethojulis strigiventer* (Bennett), 79 mm.

Local names: *Hikkae* (Minicoy). *Nhola* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Japan and Marshall and Tuamotu Islands and south to Australia.

393. *Stethojulis trilineata* (Bloch and Schneider)

Labrus trilineatus Bloch and Schneider, Syst. Ichth., p. 253, 1802.

Stethojulis trilineata de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 156, 1940. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 673, fig. 45, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/333).

Specimens studied: Agathi (7), 75 to 90 mm. Ameni (3), 97 to 106 mm. Kadamat (1), 99 mm. Kavarathi (13), 74 to 110 mm. Kiltan (2), 87 and 89 mm. Minicoy (6), 85 to 100 mm.

D. IX, 11(12); A. (II) III, 11; P. ii, 11-12; V. I, 5. Ll. 27-28; Ltr. 2+1+8-9.

Head 2.8-3.1 in standard length, 3.4-3.7 in total length. Depth of body 2.8-3.2 in standard length, 3.6-3.9 in total length. Snout 2.7-2.9 in head. Eye 1.9-2.3 in snout and 1.4-1.5 in convex interorbital space. A single series of

teeth in jaws. First dorsal spine almost equal to eye diameter. First anal spine minute or wanting and the third much more than eye diameter. Lateral line continuous. Pectoral equal to head without snout. Colour: Bluish to violet above and bluish white below. A light bluish band from occiput, along base of dorsal to the base of last dorsal ray; one from snout across eye, along the lateral line to the base of caudal; a band from upper lip, along lower border of eye, above base of pectoral and ending about six scales behind head; and another from below corner of mouth to the base of caudal. These bands reddish blue and sometimes bordered with darker on head and pearly white on body. Fins pale to hyaline, dorsal with a median brown longitudinal band.

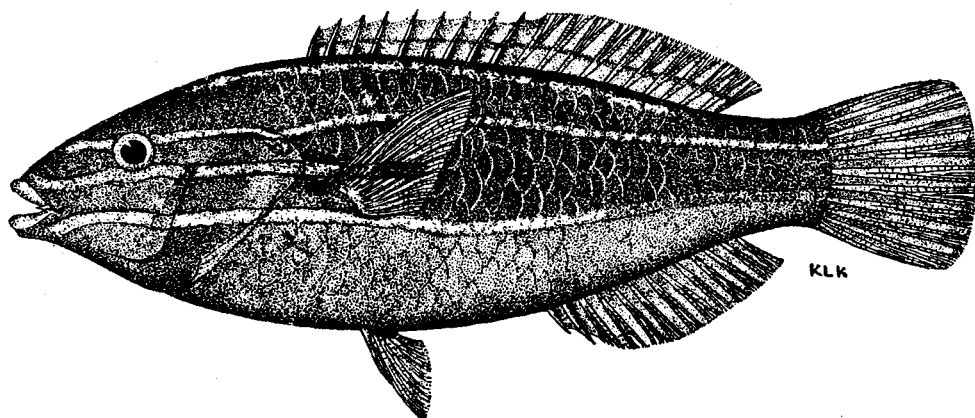


FIG. 393. *Stethojulis trilineata* (Bloch and Schneider), 92 mm.

Local names: *Hikkae* (Minicoy). *Nhola* (other islands).

Distribution: Tropical Indo-Pacific from the Red Sea and Madagascar to the Laccadives, Indonesia, Philippines, Palau Islands and Bismarck Archipelago.

394. *Stethojulis albobittata* (Bonnaterre)

Labrus albobittatus Bonnaterre, Tableau Encyclop. Ichth., p. 108, pl. 98, fig. 399, 1788.
Stethojulis albobittata de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 159, 1940. Smith, Fishes of Southern Africa, p. 291, pl. 57, fig. 802, 1949. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 672, fig. 43, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/334).

Specimens studied: Agathi (2), 78 and 81 mm. Ameni (1), 85 mm. Kadamat (11), 54 to 77 mm. Kavarathi (3), 70 to 82 mm. Minicoy (14), 57 to 88 mm.

D. (VIII) IX, 11(12); A. (II) III, 11; P. ii, 12; V. I, 5. Ll. 26-28; Ltr. 2+1+9.

Head 2.8-3.1 in standard length, 3.6-4.0 in total length. Depth of body 2.9-3.3 in standard length, 3.7-4.2 in total length. Snout 2.7-3.0 in head. Eye 1.8-2.3 in snout and 1.3-1.6 in convex interorbital space. A single series of teeth in jaws. Length of pectoral slightly more than head without snout. Caudal rounded. Lateral line continuous. Colour: Bluish brown above, bluish white below. An indistinct light band from above eye to below base of last dorsal ray. A white band from median line of snout to anterior border of eye, continued behind eye backwards along upper edge of opercle and ending about six scales from head. Another band from snout along lower border of eye, opercle, above pectoral to the base of median caudal rays. A white band from corner of mouth, over cheek and opercle, upwards along the hind border of subopercle to the base of pectoral and backwards ending above or behind last anal ray. Fins yellowish to hyaline.

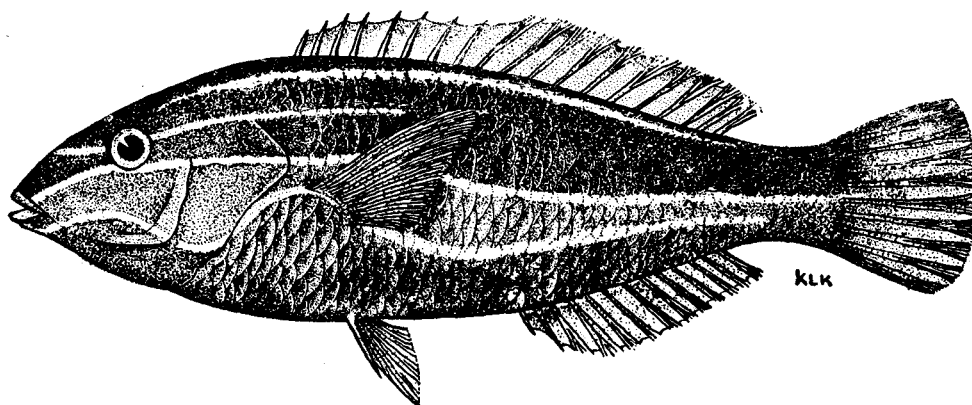


FIG. 394. *Stethojulis albovittata* (Bonnaterre), 74 mm.

Local names: *Hikkae* (Minicoy). *Nhola* (other islands).

Distribution: East coast of Africa and Red Sea, Laccadives, Indonesia to the Philippines and Fiji, Samoan and Cook Islands and Queensland.

395. *Hologymnosus semidiscus* (Lacépède)

Labrus semidiscus Lacépède, Hist. Nat. Poissons, 3, pp. 429 and 472, pl. 6, fig. 2, 1802.

Hologymnosus semidiscus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 253, fig. 37, 1940. Smith, Fishes of Southern Africa, p. 292, pl. 59, fig. 810, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/335).

Specimens studied: Agathi (4), 268 to 272 mm. Bitra (4), 225 to 275 mm. Kavarathi (8), 165 to 278 mm. Minicoy (1), 240 mm.

D. IX, 12; A. III, 12; P. ii, 11; V. I, 5. Ll. 103-106. Ltr. 7+1+43-47.

Head 3.0-3.3 in standard length, 3.5-3.8 in total length. Depth of body 4.0-4.7 in standard length, 4.7-5.5 in total length. Snout 2.5-2.7 in head. Eye 3.0-3.4 in snout and 1.3-1.6 in highly convex interorbital space. Teeth in a crowded row in jaws, the anterior 2-4 canines. Pectoral longer than postorbital part of head. Ventral as long as snout. Colour: Variable, generally brown with greenish tinge; 16-21 narrow dark vertical bands on body. Some specimens with a broad vertical creamy band on sides above origin of anal spines or slightly anterior to it. A light bluish brown band from eye to posterior part of mouth, one from below eye to cheek and one or two bands from hind border of eye to upper part of operculum. A similar band from lower border of eye backwards ending in a black blotch on opercular flap. The largest specimen with a vertical black bar on body at the level of tip of pectoral. Dorsal and anal brown with a dark submarginal and a white marginal longitudinal bands and with dark blue blotches between rays. Caudal brown, the distal part excepting outer rays yellowish. Upper rays of pectoral darker.

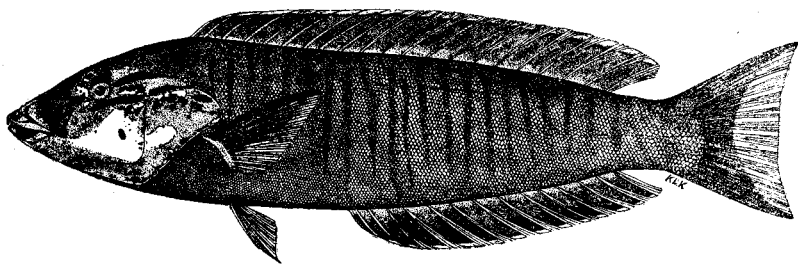


FIG. 395. *Hologymnosus semidiscus* (Lacépède), 218 mm.

Local names: *Dielahikkae* (Minicoy). *Vayittukadiyan* (other islands).

Distribution: Tropical Indo-Pacific from the east coast of Africa to the Laccadives, Indonesia, Philippines, Ryukyu, Gilbert, New Hebrides, Fiji and Society Islands.

396. *Coris formosa* (Bennett)

Labrus formosus Bennett, Fishes of Ceylon, pl. 16, 1834.

Coris formosa Day, Fishes of India, p. 407, 1878 (in part). Smith, Ichth. Bull., 8, p. 119, pl. I, B and II, B, 1957. Jones and Kumaran, Indian J. Fish., 6, pp. 47 and 51, fig. 6, d, 1959. Smith and Smith, Fishes of Seychelles, p. 38, pl. 82, B, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/336).

Coris gaimard Smith, Fishes of Southern Africa, p. 292, pl. 58, fig. 809 (upper), 1949. (not of Quoy and Gaimard).

Coris gaimardi de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 242, 1940. (synonymy in part). Munro, Fishes of Ceylon, p. 193, pl. 38, fig. 574, 1955 (not of Quoy and Gaimard).

Specimens studied: Minicoy (6), 37 to 208 mm.

D. IX, 12; A. III, 12; P. ii, 11; V. I, 5. Ll. 73-80; Ltr. 7-8 +1+30-31.

Head 3.3-3.5 in standard length, 3.8-4.0 in total length. Depth of body 3.2-3.5 in standard length, 3.7-4.1 in total length. Eye 7.0-7.3 in head, 2.2-2.6 in snout and 1.3-1.6 in highly convex interorbital space. Teeth conical in a single series in jaws becoming larger anteriorly, the anterior two in each jaw canines. Pectoral longer than head without snout. Ventral equal to or longer than pectoral. First spine of dorsal elongated, as long as head, the second longer than the remaining spines. Colour: Yellowish with greenish tinge, lighter below with large blackish spots on body behind pectoral fin. Head with bluish violet bands, one band from upper lip to eye, one from eye to interorbital space meeting that of the other side and one from behind eye to base of first dorsal spine and another band from below preopercle to corner of mouth, curved obliquely below eye and running towards the base of second spine of dorsal. Hind border of operculum with an oblique band. Dorsal and anal fins light yellowish brown, basal half with dark spots, a median bluish brown band, outer portion of this with greenish brown spots and streaks, distal margin with narrow dark brown band leaving the tips of rays narrowly whitish. Caudal brown basally with dark spots, a red cross band in the middle and the posterior third pale yellowish. Pectoral and ventral pale yellowish, the latter with brownish outer margin.

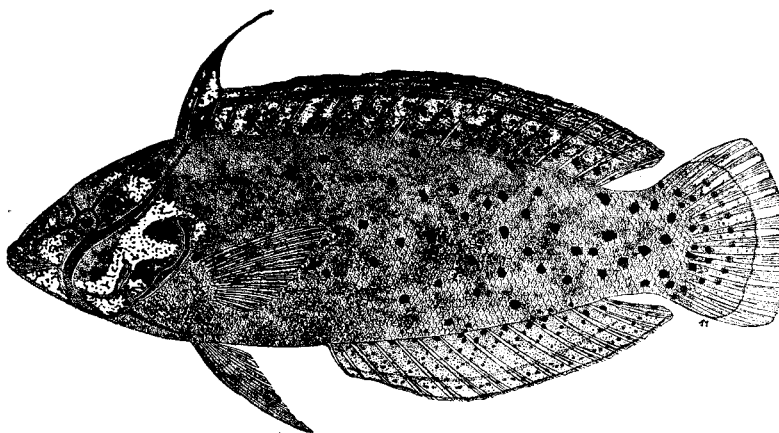


FIG. 396. *Coris formosa* (Bennett), 208 mm.

Local name: *Didanagihikkae* (Minicoy).

Distribution: East coast of South Africa, Zanzibar, Mauritius, Seychelles, Laccadives to Indonesia and Philippines and Ryukyu Islands.

Note: One juvenile specimen measuring 53 mm. shows the following colouration. The background colour is orange yellow with five chalky white areas or saddles edged with black on head and body. The first is on the snout extending laterally, the second connecting upper border of eye, the third between third and fifth dorsal spines which tapers

below, the fourth below the fourth and seventh dorsal rays. The dark borders of the third and fourth saddles extend to the dorsal fin as bands. The anterior dark border of the fifth saddle on the caudal peduncle extends on to the last fin rays. A dark band along the base of caudal. A black ocellus is present between the seventh dorsal spine and first ray of dorsal. This is one of the important characters in distinguishing the juveniles of this species from that of *Coris gaimardi* (Quoy and Gaimard).

397. *Coris gaimardi* (Quoy and Gaimard)

Julis gaimard Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 265, pl. 24, fig. 1, 1824.

Coris africana Smith and Smith, Fishes of Seychelles, p. 38, pl. 82 A, 1963.

Coris gaimard Smith, Fishes of Southern Africa, p. 292, pl. 58, fig. 809 (lower), 1949.
Jones, Bull. cent. mar. Fish Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/337).

Coris gaimardi de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 242, fig. 36, 1940 (in part).

Coris gaimard africana Smith, Ichth. Bull., 8, p. 119, pl. I, A and II, A, 1957. Jones and Kumaran, Indian J. Fish., 6, pp. 47 and 51, fig. 6, e, 1959.

Coris gaimard gaimard Smith, Ichth. Bull., 8, p. 118, 1957.

Coris greenovii de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 246, 1940.

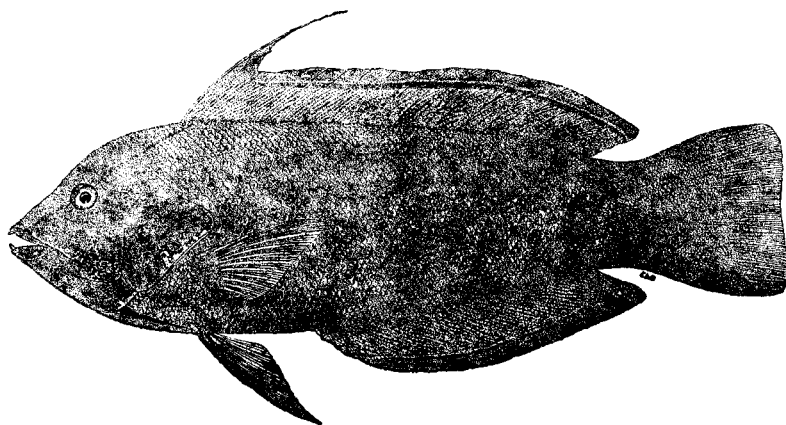


FIG. 397. *Coris gaimardi* (Quoy and Gaimard), 280 mm.

Specimens studied: Bitra (1), 280 mm. Minicoy (2), 49 and 51 mm.

D. IX, 12; A. III, 12; P. ii, 11; V. I, 5. Ll. 76-80; Ltr. 6-8+30-31.

Head 3.4 in standard length, 4.0 in total length. Depth of body 3.2 in standard length, 3.8 in total length. Eye 7.4 in head, 2.4 in snout and about 1.8 in highly convex interorbital space. Teeth conical, in a single series in jaws, a pair of teeth anteriorly in each jaw canines and a canine at corner of mouth. First spine of dorsal as long as head, second spine about half length of first and longer than the following spines. Pectoral equal to head without snout.

Ventrals one eye diameter shorter than head. Colour: Dark purplish brown, slightly lighter below. A narrow brown or bluish green stripe from upper lip passing through eye to the base of second spine of dorsal; a broad band from posterior border of eye to the upper part of operculum and another from corner of mouth to below eye and downwards to suboperculum. A similar band from chin to origin of ventral. Dorsal and anal fins purple or brown with innumerable small bluish green spots and the outer one fourth of the fins blackish brown. Pectoral axil dark brown, the fin brownish. Ventral brown, the inner rays lighter.

Local names: *Didanagihikkae* (Minicoy). *Kodiyan-nhola* (Bitra).

Distribution: East coast of Africa to the Laccadives, Indonesia, Ryukyus, and Fiji, Caroline, Samoan, Marquesas, Tuamotu and Hawaiian Islands.

Note: One juvenile specimen measuring 49 mm. is yellowish brown with five chalky white areas bordered by dark. The first blotch is superiorly on the snout; the second blotch is over the eye; the third saddle between 2nd and 5th dorsal spines, the dark margins taper ventrally; the dark margins of the fourth blotch extend on to the soft dorsal in the form of a loop; the anterior dark border of the light blotch on the caudal peduncle extends to the last ray of the dorsal. A curved dark band is present along the base of caudal.

398. *Coris frerei* Günther

Coris frerei Günther, Fishes of Zanzibar, p. 101, pl. 13, 1866. Smith, Ichth. Bull., 8, p. 120, pl. II, C, 1957. Smith and Smith, Fishes of Seychelles, p. 38, pl. 82, C, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 6, fig. 6, 1967. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 68/338).

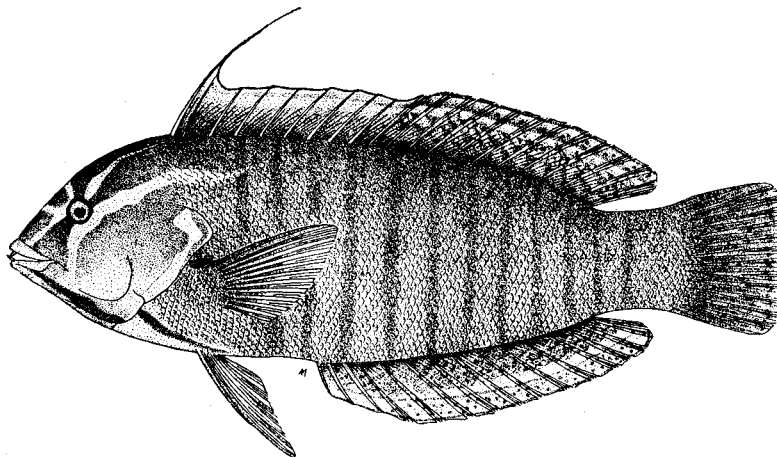


FIG. 398. *Coris frerei* Günther, 325 mm. (after Jones and Kumaran)

Specimen studied: Bitra (1), 325 mm.

D. IX, 12; A. III, 12; P. ii, 11; V. I, 5. Ll. 75; Ltr. 7+1+31.

Head 3.4 in standard length, 4.1 in total length. Depth of body 3.0 in standard length, 3.6 in total length. Eye 7.2 in head, 2.3 in snout and about 2.0 in highly convex interorbital space. Teeth conical, in a single series in jaws; two anteriorly in each jaw canines and a canine at corner of mouth. First spine of dorsal as long as head, second spine about half length of the first and longer than the following spines. Pectoral as long as head without snout. Ventral $2/3$ length of snout shorter than head. Colour: Brownish violet, becoming pale yellowish on lower half of head and abdomen; ten dark brown cross bars on sides of body. A greenish red band from maxilla touching upper border of eye to origin of dorsal; one from interopercle to corner of mouth, below eye and ending on lateral line below fourth spine of dorsal; one from behind interopercle to base of ventral and another on hind margin of opercle. Pectoral axil with a large dark green blotch. Dorsal and anal greenish brown, distal fourth more dark, basal part with small bluish spots, outer portion of anal with bluish black spots. Caudal dark bluish, hind margin orange. Pectoral axil with a large dark green blotch. Pectoral and ventral pale, upper rays of the former and outer rays of the latter brownish.

Local name: *Kodiyannhola* (Bitra).

Distribution: Mozambique, Tanganyika, Zanzibar, Pemba, Kenya, Aldabra and Seychelles in the Western Indian Ocean and Laccadives in the Central Indian Ocean.

399. *Cymolutes lecluse* (Quoy and Gaimard)

Xyrichtys lecluse Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 284, pl. 65, fig. 1, 1824.

Cymolutes lecluse de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 52, fig. 1, 1940. Smith, Fishes of Southern Africa, p. 295, pl. 68, fig. 820, 1949. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/339).

Cymolutes praetextatus Day, Fishes of India, p. 409, pl. 90, fig. 1, 1878.

Specimens studied: Ameni (2), 82 and 91 mm. Bangaram (2), 76 and 87 mm. Chetlat (6), 96 to 105 mm. Kavarathi (2), 75 and 78 mm. Minicoy (21), 36 to 90 mm. Suheli (1), 43 mm.

D. IX, 12-13; A. III, 11-12; P. ii, 10; V. I, 5. Ll. 53-60+18-21; Ltr. 4-5+1+20-21.

Head 3.0-3.3 in standard length, 3.5-3.7 in total length. Depth of body 4.0-4.3 in standard length, 4.6-5.0 in total length. Snout 2.3-2.5 in head. Eye 2.2-2.5 in snout and about equal to interorbital space. Lower jaw somewhat prominent. Teeth in a single row in jaws, the anterior two in each jaw canines. Lateral line interrupted. Pectoral slightly less than head without snout. Ventral equal to or slightly longer than postorbital part of head. Caudal truncate. Colour: Brownish pink above, lighter below. A brown band from below first dorsal

spine towards pectoral. Sometimes a dark blotch on body below sixth or seventh dorsal spine. A dark spot sometimes present on the upper part of caudal peduncle. Narrow brown indistinct vertical bands sometimes present on sides of body. Dorsal pale orange, often with light brownish reticulations and a black line between first and second spines. Other fins pale orange.

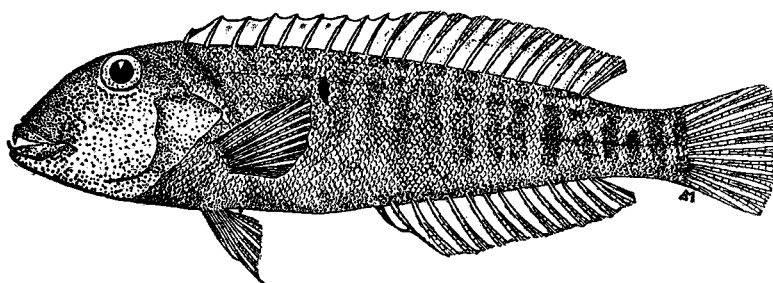


FIG. 399. *Cymolutes lecluse* (Quoy and Gaimard), 90 mm.

Local name: *Gobalahikkae* (Minicoy). *Vayittukadiyan* (other islands).

Distribution: East coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines and Fiji, Tonga and Hawaiian Islands.

400. *Iniistius pavo* (Valenciennes)

Xyrichthys pavo Cuvier and Valenciennes, Hist. Nat. Poissons, **14**, p. 61, pl. 394, 1839.

Iniistius pavo de Beaufort, Fishes of the Indo-Australian Archipelago, **8**, p. 63, fig. 13, 1940. Smith, Fishes of Southern Africa, p. 293, pl. 60, fig. 811, 1949. Balan, J. Bombay nat. Hist. Soc., **55**, p. 302, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 22, 1969 (Cat. No. CMFRI-LA-F. 69/340).

Inistius pavo Munro, Fishes of Ceylon, p. 186, pl. 36, fig. 545, 1955.

Specimens studied: Agathi (1), 58 mm. Kadamat (4), 280 to 334 mm. Kavarathi (3), 69 to 188 mm.

D₁. II; D₂. VII, 12-13; A. III, 12-13; P. ii, 10; V. I, 5. Ll. 20-21 + 5-6; Ltr. 2+1+9-10.

Head 3.0-3.3 in standard length, 3.5-3.8 in total length. Depth of body 2.7-3.0 in standard length, 3.3-3.5 in total length. Eye 2.0-2.5 in snout and equal to or slightly more than interorbital space. Teeth in jaws conical, the anterior two in each jaw curved canines. First two anterior dorsal spines long and flexible, separated from the remainder of the fin and situated over the head. Pectoral and ventral subequal, equal to or shorter than postorbital part of head and half eye diameter together. Lateral line interrupted. Cheeks practically naked. Colour: Pale yellowish with three or four broad brown cross bands on body. Sometimes a large black ocellus on the scale above the 7th lateral

line scale. Dorsal pale yellowish with brownish oblique stripes and sometimes with a dusky marginal band. Other fins pale yellowish.

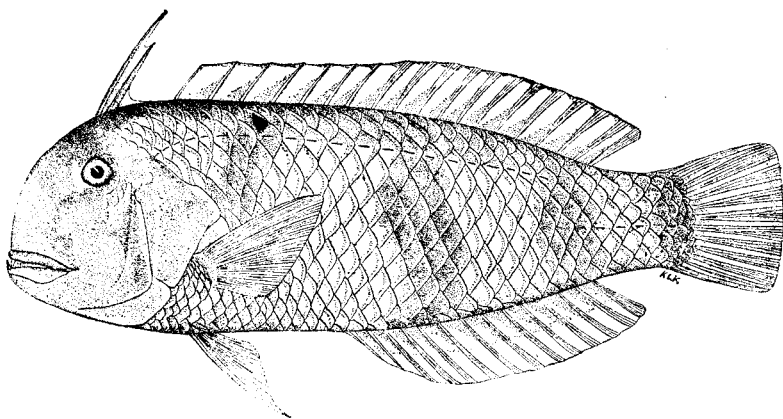


FIG. 400. *Iniistius pavo* (Valenciennes), 188 mm.

Local name: *Balala* (other islands).

Distribution: East coast of Africa and the Red Sea to the Laccadives, Ceylon, Philippines and Hawaiian, Tahiti and Marquesas Islands and the Pacific coast of Mexico.

401. *Novaculichthys taeniourus* (Lacépède)

Labrus taeniourus Lacépède, Hist. Nat. Poissons, 3, pp. 488 and 518, pl. 29, fig. 1, 1802.

Novaculichthys taeniourus Smith, Fishes of Southern Africa, p. 293, pl. 60, fig. 814, 1949.

Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 69/341).

Novaculichthys taeniurus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 69, fig. 14, 1940.

Specimens studied: Agathi (1), 113 mm. Ameni (2), 103 and 148 mm. Kalpeni (1), 203 mm. Kavarathi (2), 112 and 121 mm. Kiltan (1), 104 mm. Minicoy (8), 34 to 155 mm.

D. IX, 12-13; A. III, 12-13; P. i, 11; V. I, 5. Ll. 19-20+5-6. Ltr. 2+1+9-10.

Head 2.8-3.2 in standard length, 3.4-3.7 in total length. Depth of body 3.0-3.3 in standard length, 3.7-4.0 in total length. Snout about 4 in head. Eye 1.6-2.0 in snout and 1.0-1.3 in highly convex interorbital space. Teeth small, in several rows in jaws, outer row enlarged with a pair of canines in front. A few rudimentary scales along hind border of eye and above opercle. Pectoral equal to postorbital part of head. Ventral equal to snout and eye together.

Lateral line interrupted. Colour: More or less uniform brown with dark hind border for scales. A crescentic row of 3 scales posterior to base of pectoral black. A large black blotch between first and third dorsal spines. Dorsal and anal with oblique brown bands and narrow white border. Basal half of caudal light yellow; the distal half with dark brown vertical bars. Pectoral lighter with darker base. Ventral dark brown with narrow white distal margin. Juveniles with 1st and 2nd dorsal spines flexible and filamentous and the 5th spine often with a produced filament. 8-10 dark lines radiating from eye. Body orange coloured with large white blotches bordered by dark. Dorsal, anal and caudal yellowish with irregular dark streaks.

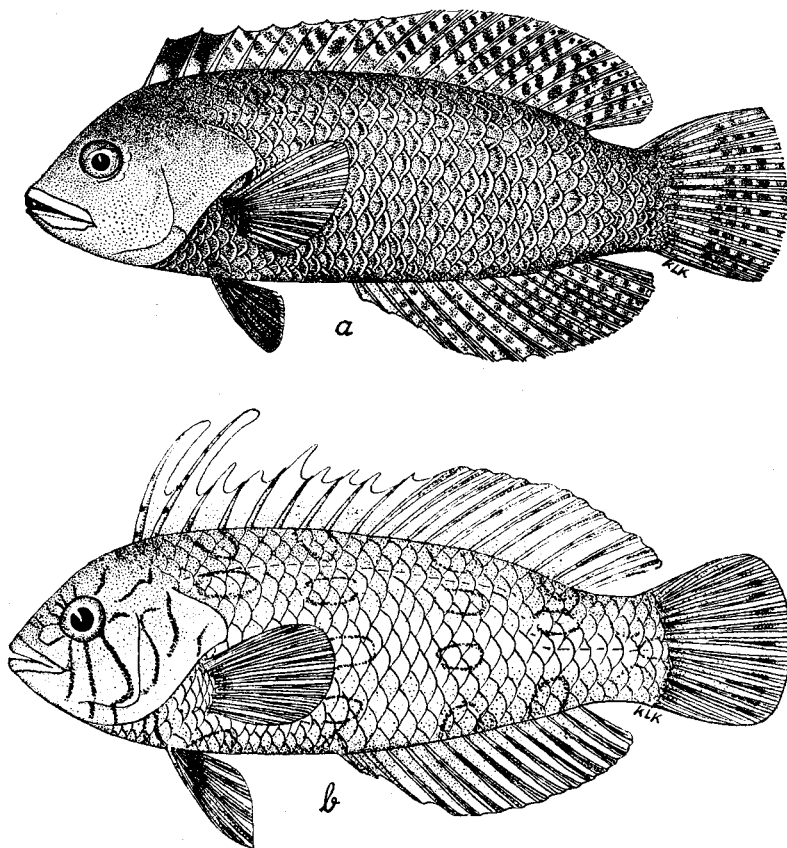


FIG. 401. (a) *Novaculichthys taeniourus* (Lacépède), 121 mm.
(b) juvenile, 38 mm.

Local names: *Balala*, *Pongan* (other islands).

Distribution: East coast of Africa, Laccadives, Ceylon to Indonesia, Philippines and New Hebrides, Marshall, Samoan, Society and Hawaiian Islands.

402. *Epibulus insidiator* (Pallas)

Sparus insidiator Pallas, Spicilegia Zoologica, **8**, p. 41, pl. 5, fig. 1, 1770.

Epibulus insidiator de Beaufort, Fishes of the Indo-Australian Archipelago, **8**, p. 73, fig. 15, 1940. Smith and Smith, Fishes of Seychelles, p. 38, pl. 29, E and pl. 86, A, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 22, 1969 (Cat. No. CMFRI-LA-F. 69/342).

Epibulus striatus Day, Fishes of India, p. 395, pl. 87, fig. 2, 1878.

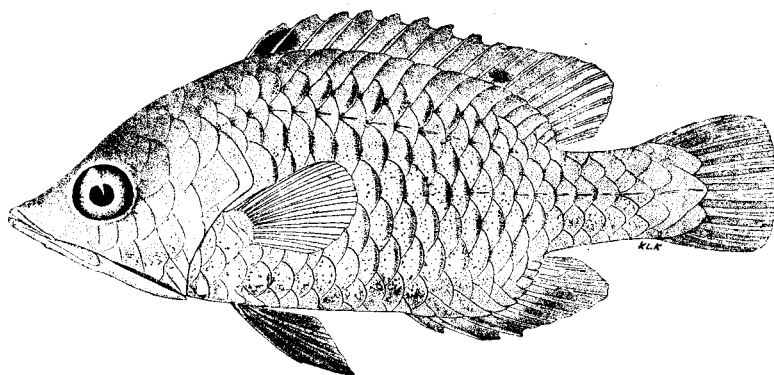


FIG. 402. *Epibulus insidiator* (Pallas), 59 mm.

Specimens studied: Minicoy (6), 27 to 59 mm.

D. IX, 10; A. III, 8; P. ii, 10; V. I, 5. Ll. 14-16+9-10; Ltr. 2+1+6.

Head 2.5-2.6 in standard length, 3.1-3.3 in total length. Depth of body 2.3-2.4 in standard length, 2.9-3.0 in total length. Eye 4.2-4.4 in head, 1.2-1.4 in snout and equal to interorbital space. Mouth oblique, highly protractile. Maxillary reaching to below middle of eye, mandible produced backwards, reaching far behind eye. Teeth conical, in a single series in jaws, the anterior pair in each jaw canines. Preopercle with two rows of scales. Dorsal spines gradually increasing in length to the last, it being more than eye diameter. First anal spine short, third anal spine longer than last spine of dorsal. Pectoral equal to or slightly longer than postorbital part of head. Ventral slightly longer than pectoral. Colour: Greenish brown to dark brown with dark vertical streaks for scales on sides of body. Dorsal, anal, caudal and ventral brown; a dark blotch between first three spines of dorsal and sometimes another between first three rays of dorsal. In the smallest specimen, three or four white lines radiating from eye and four white cross bands on sides of body and tail. All specimens available are juveniles.

Distribution: East coast of Africa to Minicoy, coasts of India, Malaysia, Indonesia, Philippines and New Hebrides, Solomon, Samoan, Society, Marshall and Tuamotu Islands and Queensland.

403. *Pseudocheilinus hexataenia* (Bleeker)

Cheilinus hexataenia Bleeker, Acta Soc. Sci. Indo-Neerl., 2, Achtste Bijdr. vischfauna Amboina, p. 84, 1857.

Pseudocheilinus hexataenia de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 97, fig. 18, 1940. Smith, Fishes of Southern Africa, p. 294, pl. 61, fig. 819, 1949. Munro, Fishes of Ceylon, p. 186, pl. 37, fig. 546, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 69/343).

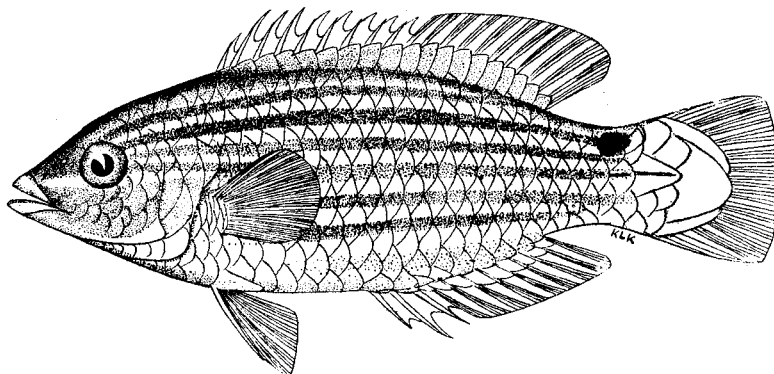


FIG. 403. *Pseudocheilinus hexataenia* (Bleeker), 48 mm.

Specimens studied: Bangaram (4), 32 to 45 mm. Minicoy (11), 25 to 52 mm.

D. IX, 12; A. III, 9; P. ii, 13; V. I, 5. Ll. 15-18 + 6-8; Ltr. 2 + 1 + 6-7.

Head 2.7-3.0 in standard length, 3.3-3.6 in total length. Depth of body 2.5-2.7 in standard length, 3.0-3.3 in total length. Snout 3.3-3.5 in head. Eye 1.2-1.4 in snout and equal to interorbital space. Jaws with a single series of small teeth; four pairs of canines anteriorly in the upper jaw, one lateral pair very long and bent backwards and outwards and the lower jaw with a pair of short canines anteriorly. Second anal spine slightly longer than third spine. Pectoral equal to postorbital part of head and half eye diameter together. Ventral equal to pectoral. Lateral line interrupted. Colour: Greenish with a median brownish band before dorsal fin and six longitudinal greenish brown bands along the sides of body. Head greenish brown. Two dark brown spots on chin. A black spot near upper edge of caudal peduncle. Dorsal, anal and ventral greenish basally, outer part light. Caudal greenish.

Local name: *Rung-hikkae* (Minicoy).

Distribution: East coast of Africa and Red Sea to the Laccadives, Ceylon, Indonesia, Philippines and eastwards to Samoan, Society, Tuamotu and Hawaiian Islands.

404. *Cheilinus chlorurus* (Bloch)

Sparus chlorurus Bloch, Naturges. Auslând. Fische, 5, p. 24, pl. 260, 1791.

Cheilinus chlorurus Day, Fishes of India, p. 393, pl. 82, fig. 6, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 76, 1940. Munro, Fishes of Ceylon, p. 186, pl. 37, fig. 547, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 69/344).

Thalliurus chlorurus Smith, Fishes of Southern Africa, p. 294, pl. 61, fig. 818, 1949.

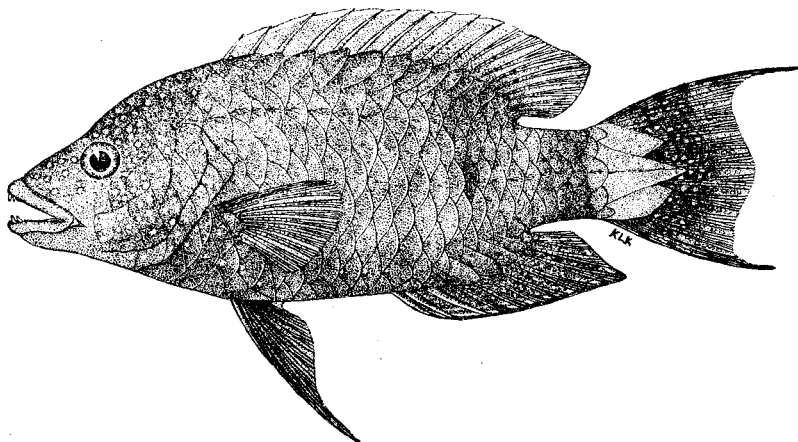


FIG. 404. *Cheilinus chlorurus* (Bloch), 143 mm.

Specimens studied: Kavarathi (1), 115 mm. Minicoy (2), 100 and 143 mm.

D. X, 9-10; A. III, 8-9; P. ii, 10; V. I, 5. Ll. 15-16 + 8-9; Ltr. 2+1+6.

Head 2.6-2.8 in standard length, 3.4-3.7 in total length. Depth of body 2.4-2.5 in standard length, 3.2-3.4 in total length. Snout 3.0-3.2 in head. Eye 1.7-1.8 in snout and 1.3-1.5 in convex interorbital space. Teeth conical, in a single row, the anterior two in jaws canines. Pectoral slightly longer than postorbital part of head. Ventral with the first ray produced, one eye diameter shorter than head. Upper and lower rays of caudal produced in adult. Third anal spine longer than second. Lateral line interrupted. Colour: Olive brown to greenish brown with the posterior part of caudal peduncle yellowish. Numerous pink spots on head and sometimes on anterior part of body. Spinous dorsal greenish brown and soft dorsal greenish brown anteriorly and lighter posteriorly. Anal greenish brown with numerous white spots. Caudal light, the central portion dark brown and with white spots in the dark portion. Ventral greenish brown. Pectoral pale yellowish.

Local names: *Thokka* (Minicoy). *Chavarichoran*, *Thokka* (Kavarathi).

Distribution: Coast of South Africa to the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Ryukyus and Tuamotu Islands and Queensland.

405. ***Cheilinus diagrammus*** (Lacépède)

Labrus diagramma Lacépède, Hist. Nat. Poissons, 3, pp. 448 and 517, 1802.

Cheilinus diagramma de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 88, 1940. Munro, Fishes of Ceylon, p. 187, pl. 37, fig. 548, 1955.

Cheilinus diagrammus Smith, Fishes of Southern Africa, p. 294, fig. 817, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 69/345).

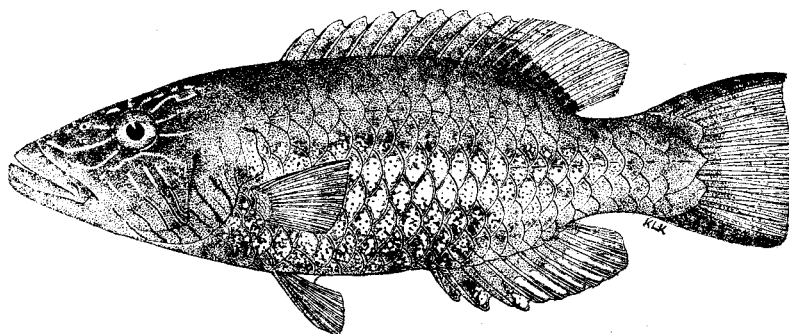


FIG. 405. *Cheilinus diagrammus* (Lacépède), 151 cm.

Specimens studied: Chetlat (1), 170 mm. Minicoy (2), 151 and 180 mm
D. IX, 10; A. III, 8; P. ii, 10; V. I, 5. Ll. 16 + 9; Ltr. 2 + 1 + 6½. GR. 6 + 9.

Head 2.6-2.8 in standard length, 3.2-3.3 in total length. Depth of body 2.8-3.0 in standard length, 3.4-3.6 in total length. Eye 5.5-5.8 in head, 2.2-2.4 in snout and 1.3-1.4 in convex interorbital space. Maxillary reaching to below or slightly behind nostrils. Teeth conical, in a single row in jaws, the anterior two in each jaw canines. Dorsal and anal with low scaly sheath. First dorsal spine shorter than eye, last spine $1\frac{1}{3}$ of eye diameter. Third anal spine longer than second and longer than last spine of dorsal. Pectoral equal to postorbital length of head, and also to ventral. Colour: Brown, slightly lighter below, 3-4 white stripes across eye, a white stripe below eye; white streaks on upper part of head. 6-8 narrow blackish oblique lines edged white on lower part of head. Spinous part of dorsal and bases of soft dorsal and anal brownish. Pectoral and ventral hyaline. Caudal hyaline, upper and lower edges with brownish markings.

Local names: *Thokka* (Minicoy). *Chavarichoran*, *Thokka* (Chetlat).

Distribution: East coast of Africa and Red Sea to the Laccadives, Ceylon, Indonesia, Philippines, Palau, Gilbert, Caroline, Fiji, Solomon, Samoan and Hawaiian Islands and Australia.

406. *Cheilinus oxycephalus* Bleeker

Cheilinus oxycephalus Bleeker, Nat. Tijds. Ned.-Ind., 5, p. 349, 1853. de Beaufort, Fishes of the Indo-Australian Archipelago, p. 569, 1961. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 191, fig. 2 e, 1970.

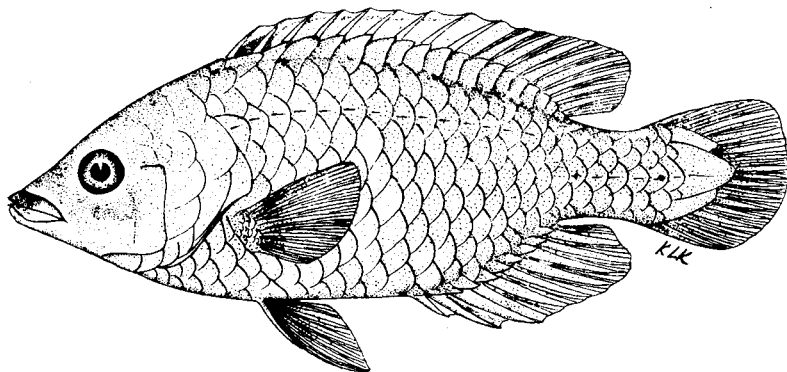


FIG. 406. *Cheilinus oxycephalus* Bleeker, 90 mm. (after Jones and Kumaran)

Specimen studied: Kavarathi (1), 90 mm.

D. IX, 10; A. III, 8; P. ii, 10; V. I, 5. Ll. 14+9; Ltr. 2+1+6.

Head 2.5 in standard length, 3.2 in total length. Depth of body 2.6 in standard length, 3.3 in total length. Eye 5.2 in head, 1.6 in snout and 1.2 in slightly convex interorbital space. Two rows of scales on preopercle, hind edge naked. Dorsal spines increasing gradually in length posteriorly, the last as long as twice eye diameter. Pectoral slightly longer than postorbital length of head. Ventral slightly shorter than pectoral. Colour: Greenish brown. Upper lip with two brownish spots on either side just behind tip. Spinous dorsal greenish with a narrow submarginal band and a dark brown spot between first and second spines. Caudal brownish with some brown transverse bars. Pectoral hyaline. Ventral greenish brown.

Local name: *Chavarichoran* (Kavarathi).

Distribution: East coast of South Africa, Seychelles, Laccadives, Indonesia, Philippines, Marshall and Society Islands and North Queensland.

407. *Cheilinus undulatus* Rüppell

Cheilinus undulatus Rüppell, Neue Wirbelt., Fische Rothen Meeres, p. 20, pl. 6, fig. 2, 1835. Day, Fishes of India, Suppl., p. 802, 1888. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 83, 1940. Smith, Fishes of Southern Africa, p. 294, 1949. Munro, Fishes of Ceylon, p. 187, pl. 37, fig. 550, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Smith and Smith, Fishes of Seychelles, p. 38, pl. 28, C, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 69/347).

Specimens studied: Chetlat (1), 265 mm. Minicoy (4), 34 to 280 mm.

D. IX, 10; A. III, 8; P. ii, 10; V. I, 5. Ll. 15-16+9-10; Ltr. 2+1+6.

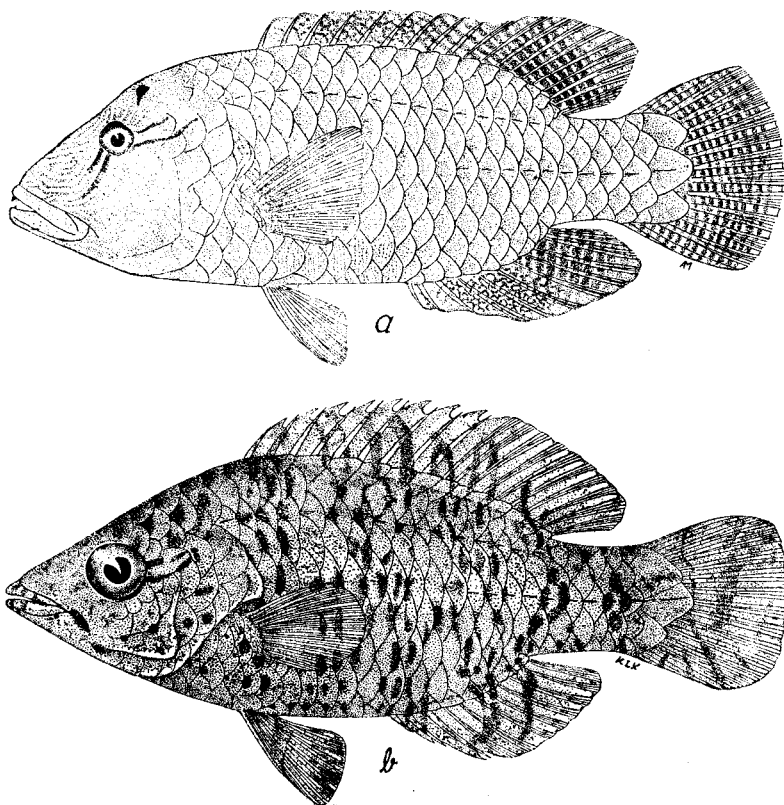


FIG. 407 (a). *Cheilinus undulatus* Rüppell. 280 mm. (b). Juvenile, 40 mm.

Head equal to depth of body, 2.5-2.6 in standard length, 3.2-3.3 in total length. Eye 7.0-7.5 in head, 2.7-3.0 in snout and 1.7 in convex interorbital space. A single row of conical teeth in jaws, with two canines anteriorly in each jaw. Longest dorsal and anal rays equal to postorbital length of head. Caudal rounded. Pectoral equal to snout and eye together. Ventral slightly shorter than pectoral. Lateral line interrupted. Colour: Olive green. Two blackish bands from eye to upper lip; two similar bands from hind border of eye obliquely upwards; a blackish mark posterodorsal to eye; head with undulating yellowish lines; scales on anterior part of body specially those on chest and belly with 3-4 vertical yellowish stripes; scales on posterior part of body with indistinct yellowish lines. Dorsal and anal pale yellowish with oblique dark greenish bars and spots. Caudal pale yellowish with 10-11 greenish vertical

stripes or rows of spots, outer margin broadly yellowish. Pectoral pale. Ventral light greenish. Juveniles greenish with vertical rows of scales on sides in four areas brownish; head with dark brown markings behind and below eye; dorsal, anal and caudal with dark irregular markings.

Local names: *Thokka* (Minicoy). *Chavarichoran*, *Thokka* (Chetlat).

Distribution: East coast of Africa to Seychelles, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Caroline, Gilbert, Samoan and Tuamotu Islands.

408. *Cheilinus trilobatus* Lacépède

Cheilinus trilobatus Lacépède, Hist. Nat. Poissons, 6, pp. 274 and 284, pl. 19, fig. 3, 1802. Day, Fishes of India, p. 394, pl. 82, fig. 4, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 79, 1940. Smith, Fishes of Southern Africa, p. 294, pl. 56, fig. 816, 1949. Munro, Fishes of Ceylon, p. 187, pl. 37, fig. 549, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 303, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 47, 1959. Jones, Proc. Symposium on Scombroid Fishes, p. 671, fig. 41, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 69/346).

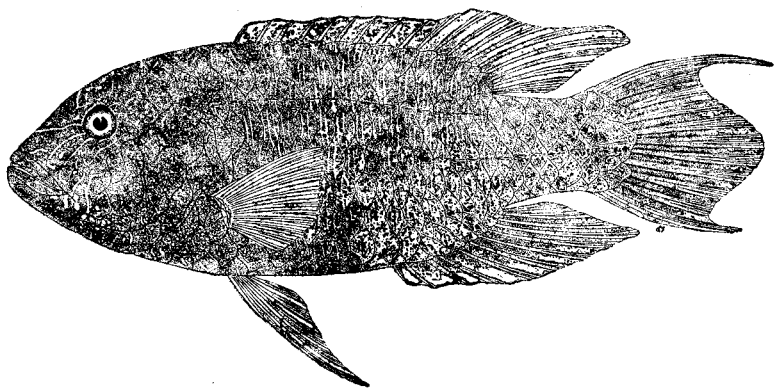


FIG. 408 (a). *Cheilinus trilobatus* Lacépède, 230 mm.

Specimens studied: Agathi (8), 70 to 165 mm. Ameni (7), 80 to 140 mm. Androth (3), 115 to 160 mm. Bitra (3), 155 to 237 mm. Chetlat (1), 170 mm. Kadamat (3), 105 to 215 mm. Kalpeni (1), 98 mm. Kavarathi (4), 110 to 230 mm. Kiltan (7), 65 to 180 mm. Minicoy (25), 45 to 220 mm. Suheli (1), 140 mm.

D. IX, 10-11; A. III, 8-9; P. ii, 10; V. I, 5. Ll. 15-16 + 8-9; Ltr. 2 + 1 + 6.

Head 2.6-2.8 in standard length, 3.3-3.7 in total length. Depth of body 2.4-2.7 in standard length, 3.1-3.4 in total length. Snout about 3.0-3.2 in head.

Eye 1.8-2.3 in snout and 1.5-1.8 in convex interorbital space. Teeth conical, in a single row, the anterior pair canines. Pectoral longer than postorbital part of head. Ventral with the first and second rays produced, about an eye diameter shorter than head. Longest anal ray as long as head without snout. Longest dorsal ray often slightly shorter than that of anal. Lateral line interrupted. Caudal rounded in juveniles, in large adults the fin appearing three lobed. Colour: Greenish brown. Three or four dark blotches on sides of body between pectoral and caudal in juveniles. Four white to pink streaks from eye to maxillary and corner of mouth and one obliquely below eye. Pink to whitish spots on head sometimes extending to anterior part of body. Dorsal and anal generally greenish brown; scales of body with 1-3 white vertical lines. Dorsal and anal greenish with white spots. Caudal greenish brown, posterior border lighter. Pectoral pale. Ventral greenish.

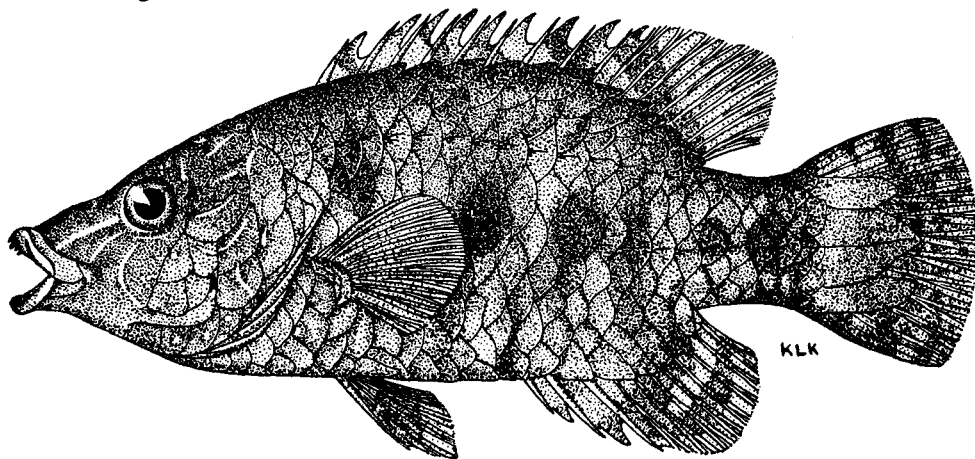


FIG. 408 (b). *Cheilinus trilobatus* Lacépède, 55 mm.

Local names: *Thokka* (Minicoy). *Chavarichoran*, *Thokka* (other islands).

Distribution: East coast of Africa and Islands of the Western Indian Ocean to the Laccadives, India, Ceylon, Indonesia, Philippines, Ryukyus and Marshall, New Hebrides, Fiji, Samoan, Society and Hawaiian Islands.

409. *Cheilinus fasciatus* (Bloch)

Sparus fasciatus Bloch, *Naturges. Auslând. Fische*, 5, p. 18, pl. 257, 1791.

Cheilinus fasciatus Day, *Fishes of India*, p. 394, pl. 84, fig. 1, 1878. de Beaufort, *Fishes of the Indo-Australian Archipelago*, 8, p. 81, fig. 16, 1940. Smith and Smith, *Fishes of Seychelles*, p. 38, pl. 84, F, 1963. Jones, *Bull. cent. mar. Fish. Res. Inst.*, 8, p. 21, 1969 (Cat. No. CMFRI-LA-F. 69/520).

Specimen studied: Minicoy (1), 192 mm.

D. IX, 10; A. III, 8; P. ii, 10; V. I, 5; Ll. 15+9; Ltr. 2+1+6.

Head 2.7 in standard length, 3.4 in total length. Depth of body 2.5 in standard length, 3.2 in total length. Snout 2.8 in head. Eye 2.3 in snout and about twice in convex interorbital space. Maxillary reaching to a vertical through hind nostril. Teeth conical, in a single row, the anterior two in each jaw curved canines. Pectoral longer than postorbital length of head. Ventral much shorter than pectoral. Third anal spine longer and stronger than second. Rays of soft dorsal and anal fins elongated. Upper and lower rays of caudal fin elongated. Inferior limb of preopercle naked. Lateral line interrupted. Colour: Pale yellowish with six black transverse bands on sides; lower sides of head and belly lighter. Narrow white stripes radiating from eye; stripes ventrolateral to eye breaking up into spots. Scattered dark brown spots on upper part of operculum and on a few scales of anterior part of sides. A black streak on base of pectoral fin. Dorsal and anal light brown with light spots and streaks; soft dorsal and anal with basal dark blotch in the middle. Caudal yellowish with a dark basal and marginal band. Pectoral yellowish. Ventral pale.

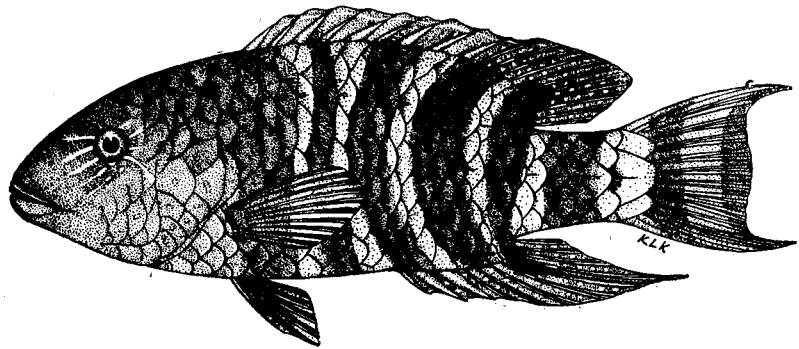


FIG. 409. *Cheilinus fasciatus* (Bloch), 192 mm.

Local name: *Fehihikkae* (Minicoy).

Distribution: East coast of Africa to Mauritius, Seychelles, Red Sea, Laccadives, coasts of India, Indonesia, Philippines, Ryukyus and Marshall, Caroline, Tuamotu and Tonga Islands and Queensland.

Family CALLYDONTIDAE

Body moderately elongate and compressed. Premaxillary firmly attached to the maxillary. Jaws forming beak; teeth coalesced forming two dental plates in each jaw, separated by a median suture; canines sometimes present on side of upper jaw. Inner upper lip fully developed or only developed posteriorly and the anterior edge adnate to the outer lip. Dorsal fin single, with IX flexible or stiff spines and 9 to 11 branched rays. Anal with three flexible spines and 9-10 branched rays. Gill membranes broadly united with isthmus. Scales large; lateral line follows contour of back but deflected below hind rays of dorsal and

continued along midaxis of caudal peduncle. Upper pharyngeal bones paired, lower pharyngeal bone single and both bear molar-like teeth.

1. A single series of scales on cheek 2
Two to four series of scales on cheek. Teeth coalesced 3
2. Inner upper lip fully developed and separate from the outer lip. Teeth in upper jaw coalesced with denticulate edges; teeth in lower jaw coalesced but individual teeth distinct at edges. Membrane between dorsal spines incised *Leptoscarus vaigiensis*
Inner lip developed only posteriorly. Free, imbricate incisor-like teeth present in jaws. Membrane between dorsal spines not incised *Cryptotomus spinidens*
3. Four rows of scales on preopercle. Snout pointed; outer rays of caudal filamentous. A yellowish band from rictus backwards to opercle and a narrow dark streak on snout *Callyodon harid*
Two rows of scales on preopercle and sometimes a third row of one to three scales on preopercle flange 4
4. Two rows of scales on preopercle, its flange broadly naked. Usually 4 predorsal scales 5
Two rows of scales on preopercle and one to three scales on preopercle flange. Usually 6-7 predorsal scales 8
5. Brownish, caudal peduncle and caudal fin lighter. A broad dark area on upper part of snout through eye to upper edge of operculum, cheek lighter. A pale yellowish band along upper lip and another along lower lip, a broad greenish band below lower lip and a yellowish band on chin. Teeth greenish *Callyodon sordidus*
Colour not as above 6
6. Teeth green. General body colour deep green, edges of scales slightly lighter; snout and dorsal side of eye bluish green, scales of head and upper sides of anterior part of body with pale spots; dorsal and anal blue black with narrow green margin *Callyodon capitaneus*
Teeth whitish. Body not deep green 7
7. Greyish brown with greenish tinge; centre of scales often darker; edges of lips greyish green; a small dark spot between first two dorsal spines *Callyodon taeniurus*
Greenish brown, scales on sides of body with a lighter hind border; upper part of snout darker; border of upper lip pale with a green band above to below eye; two green streaks behind eye; lower lip with a green band upto rictus; a transverse green band on chin; midventral line upto vent green *Callyodon bataviensis*
8. Snout swollen before eye and almost vertical above mouth. Outer rays of caudal produced. Greenish with reddish brown tinge above and yellowish

- green below; upper lip orange, bordered with green band and above this a pale band on snout upto eye and a broad dark green area above; lower lip green, an orange band, and a curved green band below
 *Callyodon jordani*
- Snout normal. Colour not as above 9
9. Teeth green 10
 Teeth yellowish 12
10. Lips rather narrow; no posterior canines. Pale yellowish, head above level of eye and upper part of back upto below seventh dorsal spine dark; dorsal and anal yellowish basally, bluish distally, the two colours separated by a median dusky line *Callyodon pectoralis*
 Lips broad, covering more than half of dental plates; a rudimentary posterior canine often present 11
11. Body dark bluish green, lighter below; lower side of head below eye bright green, lips pale creamy continued as a band to eye, a light green band from eye across snout *Callyodon janthochir*
 Body dark brown; lips pale yellowish, cheek lighter, a dark bar from below lower lip to behind rictus; pale streaks extending forward and backward eye *Callyodon niger*
12. One or two short posterior canines often present in upper jaw. Brownish to reddish brown, scales on back and sides with dark hind border, some dark spots and streaks on sides forming horizontal bands. Dorsal pale yellowish to brownish with dusky outer edge *Callyodon sexvittatus*
 No posterior canines 13
13. A bluish band from eye to corner of mouth and a short one on chin. Dorsal yellowish with bluish edge and a row of bluish dark spots; anal yellowish with a dark basal band and bluish ventral edge
 *Callyodon ghobban*
 Light brownish grey above becoming creamy white below; five dark cross bars on back slightly slanting forward. Dorsal, anal and caudal pale yellowish, dorsal with slightly dusky edge *Callyodon scaber*

410. *Leptoscarus vaigiensis* (Quoy and Gaimard)

Scarus vaigiensis Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 288, 1824.

Leptoscarus coeruleopunctatus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 259, 1940. Smith, Fishes of Southern Africa, p. 296, pl. 62, fig. 825, 1949.

Leptoscarus vaigiensis de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 257, fig. 38, 1940. Smith, Fishes of Southern Africa, p. 296, pl. 62, fig. 826, 1949. Smith and Smith, Fishes of Seychelles, p. 40, pl. 27, E, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/348).

Scarichthys caeruleopunctatus Day, Fishes of India, p. 410, pl. 87, fig. 5, 1878.

Scarus (Calliodon) coeruleo-punctatus Rüppell, Neue Wirbelt, Fische Rothen Meeres, p. 24, pl. 7, fig. 3, 1835.

Specimens studied: Minicoy (4), 85 to 195 mm.

D. IX, 10; A. III, 9; P. ii, 11; V. I, 5. Ll. 25; Ltr. 2+1+6½.

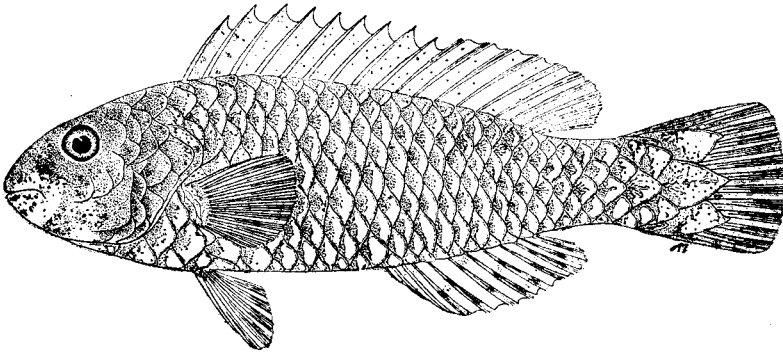


FIG. 410. *Leptoscarus vaigiensis* (Quoy and Gaimard), 85 mm.

Head 3.1-3.2 in standard length, 3.8-4.0 in total length. Depth of body 3.3-3.6 in standard length, 4.1-4.5 in total length. Eye 4.8-5.1 in head, 1.6-1.7 in snout and 1.2-1.3 in interorbital space. A single row of scales on cheek. 4 or 5 predorsal scales. Inner upper lip fully developed and separated from the outer lip. In females, teeth in upper jaw coalesced, but the edges denticulate. In males, outer side of upper jaw superiorly with a few strong canines. Teeth in lower jaw coalesced but individual teeth distinct at edges. Membrane between dorsal spines incised. Median dorsal spines as long as snout and half eye together and slightly shorter than longest dorsal rays. First anal spine minute, third longest, as long as snout and shorter than longest anal rays. Pectoral as long as postorbital part of head and about half eye together. Ventral slightly shorter than pectoral. Colour: Greenish grey; centre of scales on body with dark brown spot. An oblique creamy band on chin and another vertical band below eye. Dorsal and caudal pale with dusky patches. Pectoral hyaline with a narrow brown band at base. Ventral hyaline.

Local name: *Hima-landae* (Minicoy).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Indonesia, Philippines, Ryukyu Islands, Taiwan, south to Queensland and east to Caroline, Cook and Tuamotu Islands.

411. *Cryptotomus spinidens* (Quoy and Gaimard)

Scarus spinidens Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 289, 1824.

Callyodon viridescens Day, Fishes of India, p. 410, pl. 90, fig. 2, 1878.

Calotomus spinidens Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959.

Cryptotomus spinidens de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 262, fig. 39, 1940. Smith, Fishes of Southern Africa, p. 296, pl. 62, fig. 827, 1949. Munro, Fishes of Ceylon, p. 195, pl. 39, fig. 577, 1955. Balan, J. Bombay Nat. Hist. Soc., 55, p. 303, 1958. Smith and Smith, Fishes of Seychelles, p. 40, pl. 27, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/349).

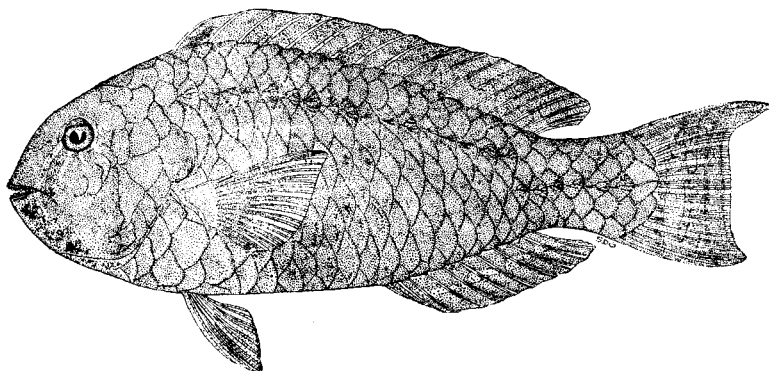


FIG. 411. *Cryptotomus spinidens* (Quoy and Gaimard), 195 mm.

Specimens studied: Agathi (7), 76 to 212 mm. Ameni (3), 68 to 95 mm. Bitra (18), 100 to 180 mm. Chetlat (4), 123 to 182 mm. Kadamat (6), 63 to 174 mm. Kavarathi (13), 114 to 135 mm. Minicoy (14), 85 to 208 mm.

D. IX, 10; A. III, 9; P. ii, 11; V. I, 5. Ll. 24-25; Ltr. 2+1+6½.

Head 3.0-3.3 in standard length, 3.6-4.1 in total length. Depth of body 2.4-2.7 in standard length, 3.0-3.5 in total length. Eye 4.7-5.6 in head, 1.3-1.7 in snout and 1.2-1.5 in slightly convex interorbital space. A row of incisor-like teeth in the upper jaw, the posteriormost flaring outwards and an inner row of small teeth ending as a toothless ridge anteriorly and two large conical teeth in front. In the lower jaw a single row of incisor-like teeth posteriorly and in two overlapping rows anteriorly near symphysis. Anterior nostril with a small flap. Dorsal spines flexible, first as long as snout, the last as long as longest dorsal rays. First anal spine minute, third longer than eye but shorter than anal rays. Pectoral slightly longer than head without snout. Caudal rounded in juveniles, the outer rays slightly produced in adults. Colour: Variable; generally greenish brown, lighter below, sides of body with irregular dark markings. Head sometimes with 5 or 6 light bars radiating from eye, the two anteriormost from eye to rear of mouth. Dorsal basally greenish, distally brownish with white

streaks and spots and a dark blotch between first and second or second and third spines. Anal uniform dusky or greenish basally and dusky with light markings. Caudal greenish to dusky with pale streaks or spots and posterior white margin. Pectoral hyaline, dark basally. Ventral hyaline basally, dark distally or with dusky spots.

Local names: *Fehilandae* (Minicoy). *Veesam* (other islands).

Distribution: Red Sea and east coast of Africa to the Laccadives, coasts of India, Ceylon, Andamans, Indonesia, Philippines, Taiwan and Caroline, Hawaiian, New Hebrides, Society and Cook Islands.

412. *Callyodon harid* (Forskål)

Scarus harid Forskål, Descript. Animal., p. 30, 1775.

Callyodon harid de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 276, 1940 (in part). Munro, Fishes of Ceylon, p. 195, pl. 39, fig. 578, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/350).

Hipposcarus harid Smith, Ichth. Bull., 1, p. 17, pl. 44, A and B, 1956.

Hipposcarus harid harid Smith, Ichth. Bull., 16, p. 276, 1959.

Hipposcarus harid vexillus Smith, Ichth. Bull., 16, p. 277, pl. 44, A and B and fig. 9, 1959.

Pseudoscarus harid Day, Fishes of India, p. 411, 1878.

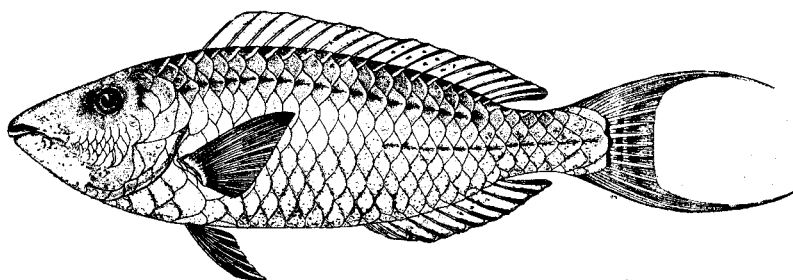


FIG. 412. *Callyodon harid* (Forskål), 315 mm.

Specimen studied: Bitra (1), 315 mm.

D. IX, 10; A. III, 9; P. ii, 13; V. I, 5. Ll. 25; Ltr. 2+1+6½.

Head 3.2 in standard length, 4.4 in total length. Depth of body 3.1 in standard length, 4.3 in total length. Eye 6.6 in head, 3.2 in pointed snout and 1.7 in almost flat interorbital space. Lips broad, almost fully covering dental plates; dental plates white; two canines posteriorly in upper jaw. Four rows of scales on cheek, leaving a broad suborbital area and preopercular limb naked. 4 predorsal scales. Nostrils minute, about one eye diameter before eye. Dorsal spines gradually decreasing in length to the last, first spine twice eye diameter, soft rays equal to anterior spines in length. Pectoral half length of snout

shorter than head. Caudal lobes much produced. Colour: Greenish grey with dusky tinge above becoming yellowish white below. Lips orange, continued backwards as a broad yellowish band to opercle. A narrow dark streak on snout above the orange band. Dorsal and anal yellowish, narrowly edged with blue and with some bluish spots. Upper rays of pectoral pale bluish, rest of the fin hyaline. Caudal with three dusky blue vertical lines, outer edges of lobes bluish. Ventral yellowish.

Local name: *Valan-chandi* (Bitra).

Distribution: Widely distributed in the Indo-Pacific from the Red Sea, east coast of Africa, Laccadives, coasts of India and Ceylon to Indonesia, Philippines and Caroline, Samoan and Tuamotu Islands.

Note: There does not seem to be enough justification in the creation of the subspecies *harid vexillus* by Smith (1959) as the difference in colour between Red Sea specimens and Western Indian Ocean specimens is too slight to be of any subspecific distinction. Our specimen clearly shows a yellowish band from rictus to operculum which is very broad posteriorly but lacks blue spots along the midside above vent. Specimens from the Pacific described as *schultzi* by Smith, 1956 appear to be distinct as it has always 3 rows of scales on the cheek and as the cheek scaling exceeds interorbital distance.

413. *Callyodon sordidus* (Forskål)

Scarus sordidus Forskål, Descript, Animal., p. 30, 1775.

Callyodon sordidus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 314, 1940. Smith, Fishes of Southern Africa, p. 295, pl. 106, fig. 822, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/351).

Pseudoscarus sordidus Day, Fishes of India, p. 413, 1878.

Xanothon bipallidus Smith, Ichth. Bull., 1, p. 5, pl. 41, D, 1956. Smith, Ibid., 16, p. 278, pl. 41, D, 1959.

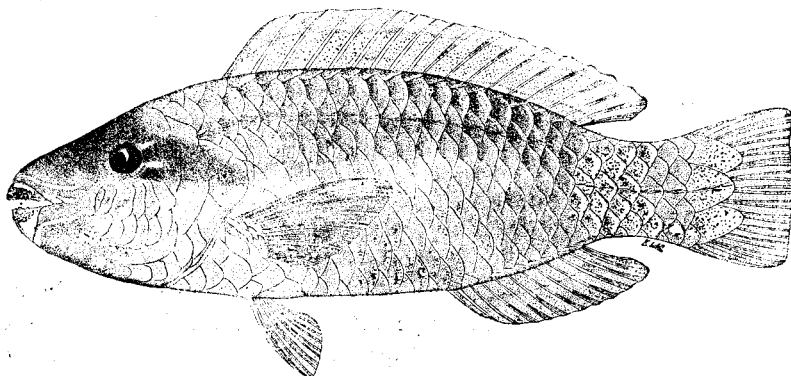


FIG. 413. *Callyodon sordidus* (Forskål), 215 mm.

Specimens studied: Agathi (3), 172 to 215 mm.

D. IX, 10; A. III, 9; P. ii, 13; V. I, 5. Ll. 24-25; Ltr. 2+1+6½.

Head equal to depth of body, 2.6-2.7 in standard length, 3.1-3.2 in total length. Eye 6.5-7.7 in head, 2.4-3.0 in snout and 2.1-2.5 in convex interorbital space. Teeth greenish, lips narrow, covering much less than half of dental plates, a rudimentary canine posteriorly in large specimen, absent in small specimens. Nostrils small, the posterior less than an eye diameter before eye. Two rows of scales on cheek, preopercular flange broadly naked. 4 predorsal scales. Dorsal spines and rays subequal, equal to twice eye diameter or longer. Pectoral longer than head without snout. Caudal truncate or slightly rounded. Colour: Variable; preserved specimens brownish to dark brown, caudal peduncle and caudal fin pale yellowish. Scales of body with dark centre and pale hind margin. A broad dark area on upper part of snout through eye to upper edge of operculum, cheek lighter. A pale yellowish band along upper lip and another along lower lip, an irregular broad greenish band below lower lip and pale yellowish band on chin. Two or three pale yellowish streaks behind eye. Dorsal pale yellowish with an outer broad violet band, the lower edge of this band slightly darker; a violet basal band posteriorly on soft fin. Anal yellowish with greenish tinge, $\frac{1}{4}$ to $\frac{1}{3}$ of basal part violet. Pectoral pale brownish, a pale streak along upper one or two rays, distal edge of the fin hyaline. Ventral pale.

Local name: *Chandi* (Agathi).

Distribution: Widely distributed from the Red Sea and east coast of Africa to the Laccadives, coasts of India, Andamans, Indonesia, Philippines, Ryukyus, China and Marianas, Marshall, Samoan, Society, Kingman, Hawaiian and Tuamotu Islands.

Note: Smith has stated that *bipallidus* Smith, 1956 has been recorded by many workers as *sordidus* Forskal, 1775 and that it is not possible to be certain of Forskal's species. We find that the colour of body and also of dorsal and anal fins is highly variable and so we have accepted the widely used name for this species. The dark area on the snout may appear as a squarish blotch or may be only light brownish. Basal $\frac{1}{3}$ of anal is violet or pale brownish and the outer $\frac{2}{3}$ is pale yellowish or greenish. The width of the bands on the dorsal and anal is also variable.

414. *Callyodon capitaneus* (Valenciennes)

Scarus capitaneus Cuvier and Valenciennes, Hist. Nat. Poissons, 14, p. 228, pl. 403, 1839.

Callyodon capitaneus Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 393, fig. 14, 1965.

Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/352).

Xanodon capitaneus Smith, Ichth. Bull., 1, p. 5, pl. 41, F, 1956. Smith, Ibid., 16, p. 268, pl. 41, F, 1959. Smith and Smith Fishes of Seychelles, p. 41, pl. 75, F, 1963.

Specimens studied: Ameni (1), 155 mm. Bangaram (3), 154 to 235 mm. Bitra (1), 320 mm. Kavarathi (2), 275 and 315 mm. Minicoy (4), 173 to 185 mm.

D. IX, 10; A. III, 9; P. ii, 13 (14 on one side of one specimen); V. I, 5. Ll. 24-25; Ltr. 2+1+6 $\frac{1}{2}$.

Head 2.9-3.1 in standard length, 3.6-3.8 in total length. Depth of body 2.7-2.9 in standard length, 3.5-3.7 in total length. Eye 6.2-8.4 in head, 2.7-3.6 in snout and 2.4-3.2 in convex interorbital space. Cheek with 2 rows of scales, preopercle flange naked. 4 scales before dorsal. Teeth green, edges white, lips narrow, covering less than $1/3$ of dental plates; one or two canines posteriorly in upper jaw in large specimens. Dorsal profile of snout somewhat rounded in young and more pronounced with age. Anterior nostril with a low rim, posterior nostril much larger and about an eye diameter before eye. Dorsal spines subequal, 2.2-2.4 times eye diameter, rays slightly longer. Pectoral about $2/3$ length of snout shorter than head. Caudal truncate in juveniles, lobes produced in adults. Colour: Deep green, snout and dorsal side of eye bluish green, edges of scales slightly lighter, scales of head and upper sides of anterior part of body with several small pale spots. Dorsal and anal blue black with narrow green margin. Caudal blue black, upper, lower and distal edges green. Pectoral green, mid-dorsal rays blackish. Ventral green, first ray lighter.

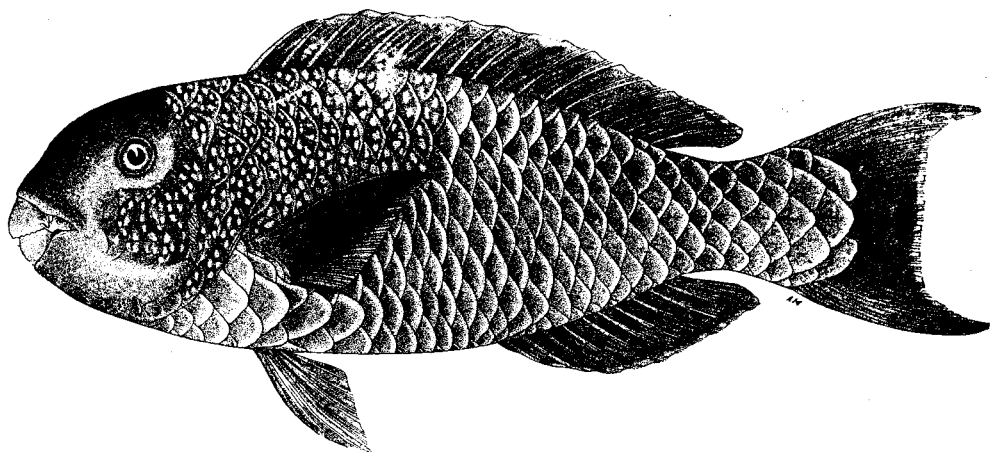


FIG. 414. *Callyodon capitaneus* (Valenciennes), 320 mm. (after Jones and Kumaran)

Local names: *Nulandae* (Minicoy). *Pachachandi* (other islands).

Distribution: Mauritius, Reunion, Zanzibar, Mozambique, Seychelles and Laccadives in the Indian Ocean.

Note: The specimens described above agree in general with the figure of 340 mm. specimen of Smith. The dorsal profile of the snout as seen from the figure of Cuvier and Valenciennes is descending evenly and does not agree with even the smallest specimen in our collection. In small specimens, the caudal fin is truncate and the profile of snout is convex and is more pronounced with age. According to Smith (1959) the type of *capitaneus* has 2, 12 pectoral rays. Schultz (1958) has synonymised *capitaneus* and *cyanescens* but the latter appears to be a different species altogether. We feel that the differences in the specimens described above justifies specific distinction and if this proves to be so the name *laccadivensis* is provisionally proposed.

415. *Callyodon taeniurus* (Valenciennes)

Scarus taeniurus Cuvier and Valenciennes, Hist. Nat. Poissons, 14, p. 257, 1839. Schultz, Bull. U.S. Nat. Mus., 214, p. 61, fig. 8, 1958.

Callyodon taeniurus Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 400, fig. 21, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/353).

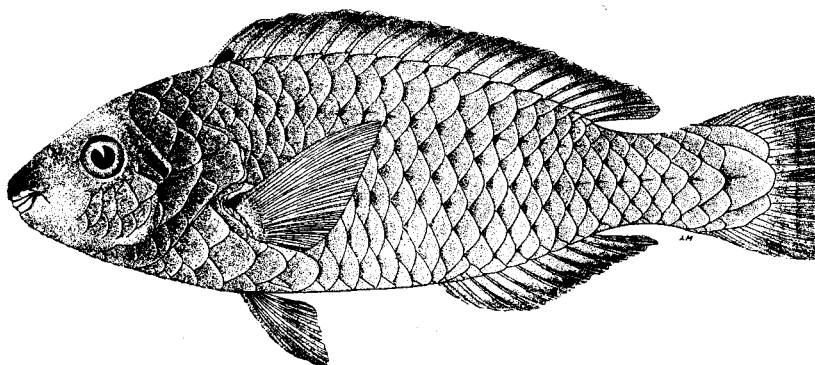


FIG. 415. *Callyodon taeniurus* (Valenciennes), 135 mm. (after Jones and Kumaran)

Specimens studied: Agathi (6), 58 to 130 mm. Kadamat (14), 110 to 185 mm. Kalpeni (18), 35 to 132 mm. Kavarathi (18), 35 to 115 mm. Minicoy (29), 48 to 170 mm.

D. IX, 10; A. III, 9; P. ii, 12 (13); V. I, 5. Ll. 23-24; Ltr. $2+1+6\frac{1}{2}$.

Head 2.8-3.1 in standard length, 3.4-3.7 in total length. Depth of body, 2.8-3.0 in standard length, 3.4-3.6 in total length. Eye 5.3-6.4 in head, 1.6-1.8 in snout and 1.5-1.7 in convex interorbital space. Two rows of scales on cheek, preopercle flange naked. Four scales before dorsal. Teeth whitish, lips broad, nearly covering the dental plates in small specimens and about $\frac{1}{4}$ of dental plates uncovered in adults, a canine in upper jaw, none in lower. Pectoral longer than head without snout. Caudal rounded in young, truncate in adults. Dorsal spines subequal, about $1\frac{1}{4}$ eye diameter, rays slightly longer. Colour: Greyish brown; some specimens with greenish tinge, centre of scales on sides of body sometimes darker, edges of lips often greyish green. Dorsal brownish with pale outer margin and a small dark spot on membrane between 1 and 2 spines. Anal brownish with a pale outer margin. Caudal brownish with a narrow white hind edge and sometimes 2 or 3 indistinct dark cross bands. Pectoral pale hyaline, a dark spot at base of upper pectoral rays. Anterior margin of ventral brownish, rest of the fin pale.

Local names: *Alilandae* (Minicoy). *Veesam* (other islands).

Distribution: Red Sea and Mauritius, Laccadives, Indonesia to the Marianas, Marshall, Phoenix, New Hebrides, Samoan, Society and Hawaiian Islands.

416. *Callyodon bataviensis* (Bleeker)

Scarus bataviensis Bleeker, Nat. Tijds, Ned.-Ind., 13, p. 342, 1857.

Callyodon bataviensis de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 323, 1940. Munro, Fishes of Ceylon, p. 197, pl. 39, fig. 585, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/354).

Pseudoscarus bataviensis Day, Fishes of India, Supple., p. 803, 1888.

Scarus forsteri Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959 (not of Cuvier and Valenciennes).

Xanodon bataviensis Smith, Ichth. Bull., 1, p. 6, pl. 41, A, 1956, Smith, Ibid., 16, p. 268, pl. 41, A, 1959.

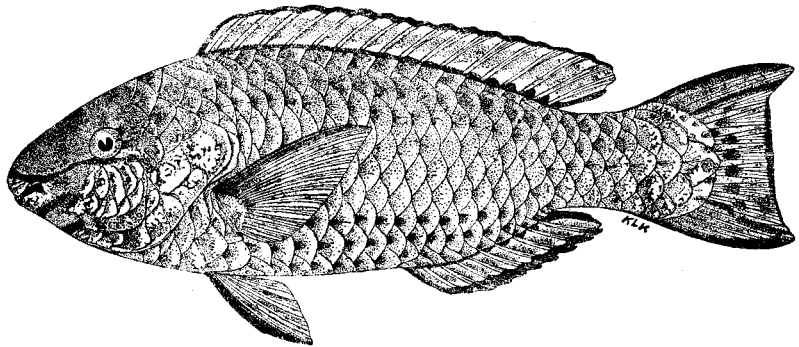


FIG. 416. *Callyodon bataviensis* (Bleeker), 160 mm.

Specimens studied: Agathi (3), 132 to 158 mm. Bitra (4), 130 to 170 mm. Chetlat (4), 160 to 190 mm. Minicoy (8), 168 to 220 mm.

D. IX, 10; A. III, 9; P. ii, 12; V. I, 5. Ll. 24; Ltr. 2+1+6½.

Head 2.8-3.0 in standard length, 3.4-3.6 in total length. Depth of body 2.8-2.9 in standard length, 3.4-3.5 in total length. Eye 5.7-6.7 in head, 1.9-2.6 in snout and 1.7-2.1 in convex interorbital space. Two rows of scales on cheek, preopercular flange naked. 4 predorsal scales. Teeth whitish, upper lip covering most of the plates, lower lip more than half, one or two outwardly flaring canines posteriorly in upper plate, and sometimes one in the lower. Nostrils minute, adjacent, about one eye diameter before eye. Dorsal spines subequal, 1.7-1.9 eye diameter, rays slightly longer. Caudal truncate, lobes slightly extended in large specimens. Pectoral 3/5 length of snout shorter than head. Colour: Greenish brown, scales on sides with a lighter hind border, upper part of snout darker, cheek lighter. Border of upper lip pale with a green band above to below eye, two green streaks behind eye, lower lip with a green band upto

rictus, a transverse green band on chin and a green mark on interopercle. A green band along ventral midline upto vent. Scales of lower sides upto above base of anal with green streaks. Dorsal brownish with a basal green band breaking into spots posteriorly and a narrow green outer margin. Anal similar, with the outer green edge broader. Caudal pale, outer and inner sides of lobes with greenish bands, green spots and streaks in the middle, hind edge of fin greenish brown. Pectoral with upper rays green, base blackish above, greenish below, rest of the fin hyaline. Ventral somewhat hyaline, anteriorly edged with green, rays with greenish tinge.

Local names: *Fehi-landae* (Minicoy). *Veesam* (other islands).

Distribution: East coast of Africa and neighbouring islands, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Marshall, Palau, Palmyra, Samoan, Marquesas and Hawaiian Islands.

417. *Callyodon jordani* (Jenkins)

Pseudoscarus jordani Jenkins, Bull. U.S. Fish. Comm., 19, p. 63, fig. 21, (1899) 1901.

Callyodon africanus Smith, Mem. Mus. Dr. Alvaro de Castro, 3, p. 19, fig. 26, pl. 3, fig. 26, 1955.

Callyodon jordani Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 395, fig. 16, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/355).

Callyodon (Margaritodon) africanus Smith, Ichth. Bull., 16, p. 280, pl. 42, A, 1959. Smith and Smith, Fishes of Seychelles, p. 41, pl. 76, A, 1963.

Margaritodon africanus Smith, Ichth. Bull., 1, p. 15, pl. 42, A, 1956.

Scarops jordani Schultz, Bull. U.S. Nat. Mus., 214, p. 21, pl. 6, B, 1958.

Scarus africanus Schultz, Bull. U.S. Nat. Mus., 214, p. 75, pl. 18, E and pl. 19, E, 1958.

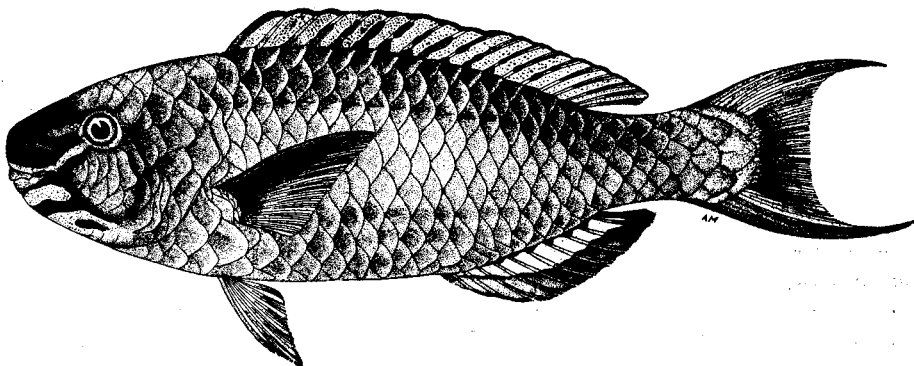


FIG. 417. *Callyodon jordani* (Jenkins), 305 mm. (after Jones and Kumaran)

Specimen studied: Bitra (1), 305 mm.

D. IX, 10; A. III, 9; P. ii, 13; V. I, 5. Ll. 25; Ltr. 2+1+6½.

Head 3.2 in standard length, 4.3 in total length. Depth of body 2.8 in standard length, 3.8 in total length. Eye 6.4 in head, 2.5 in snout and 2.3 in convex interorbital space. Nostrils small, adjacent, about $\frac{1}{4}$ eye diameter before eye. Lips broad, upper lip covering more than half, lower lip about $\frac{2}{5}$ of the green dental plates. Posteriorly in upper jaw one canine on one side and two canines on the other side. Two rows of scales on the cheek and two scales on the preopercle flange. Six predorsal scales. Pectoral $\frac{3}{5}$ length of snout shorter than head. Caudal with outer rays much produced. Snout swollen before eye and almost vertical above mouth. Colour: Greenish with reddish brown tinge above, yellowish green below. Upper lip light orange, bordered above with green band and above this a pale band on snout upto eye and a broad dark green area above. Lower lip green, an orange band below and then a curved green band. Dorsal orange coloured with green outer margin, bases of spines with green streaks and a few bluish green spots on soft part of the fin. Basal half of anal orange with greenish streaks basally, outer half green. Caudal bluish green with lighter hind margin and narrow pale bands along lobes. Pectoral with greenish dorsal edge, upper rays purple, lower $\frac{2}{3}$ of the fin hyaline. Ventral yellowish with greenish outer border.

Local name: *Chandi* (Bitra).

Distribution: So far recorded from the east coast of Africa and Aldabra to Seychelles in the Western Indian Ocean; Laccadives in the Central Indian Ocean; Hawaiian Islands, Samoa, Cocos Island, Roqueto Island and Socorro Island in the Pacific.

Note: Smith (1955) considered *africanus* distinct from *jordani* Jenkins, 1901 (type locality Honolulu) because of the remoteness of the type locality of *jordani* from Africa, by the absence of any intermediate record and in having more than one canine in the upper jaw and in the more pronounced snout. Our specimen has one canine posteriorly on one side of the upper jaw and two on the other side and the snout is rather humped anteriorly. The snout is swollen anteriorly in *jordani* even though not so prominent and the colour pattern described by Jenkins corresponds almost exactly with that given by Smith for *africanus* and also with the specimen from Bitra in the Laccadives and hence we have united the two.

418. *Callyodon pectoralis* (Valenciennes)

Scarus pectoralis Cuvier and Valenciennes, Hist. Nat. Poissons, 14, p. 269, 1839.

Callyodon cyanognathus Smith, Ichth. Bull., 16, p. 271, pl. 42, K, 1959.

Callyodon lazulinus Smith, Ichth. Bull., 1, p. 13, pl. 42, K, 1956.

Callyodon pectoralis de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 286, 1940. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 397, fig. 18, 1965. Jones, Bull. cent mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/356).

Specimen studied: Agathi (1), 158 mm.

D. IX, 10; A. III, 9; P. ii, 13; V. I, 5. Ll. 24; Ltr. 2+1+6½.

Head 2.9 in standard length, 3.7 in total length. Depth of body 2.7 in standard length, 3.5 in total length. Eye 6.3 in head, 2.6 in snout and 2.0 in convex interorbital space. Cheek with 2 series of scales and 3 scales on preopercle flange. Teeth greenish, lips rather narrow, no canines. Nostrils small, the posterior about $\frac{1}{4}$ eye diameter before eye. Dorsal spines subequal, about 2 eye diameter and equal to rays. Caudal lobes slightly extended. Colour: Pale yellowish with a dark area dorso-anteriorly above a level of lower edge of eye from top of snout extending on body to below 7th dorsal spine. Lips yellowish. Dorsal fin pale yellowish, bluish distally, the two colours defined by a submarginal dusky line. Anal fin pale yellowish basally, broadly bluish distally with a median dusky line. Caudal yellowish, upper and lower edges of the fin darker. Pectoral pale hyaline, median rays slightly darker. Ventral pale yellowish.

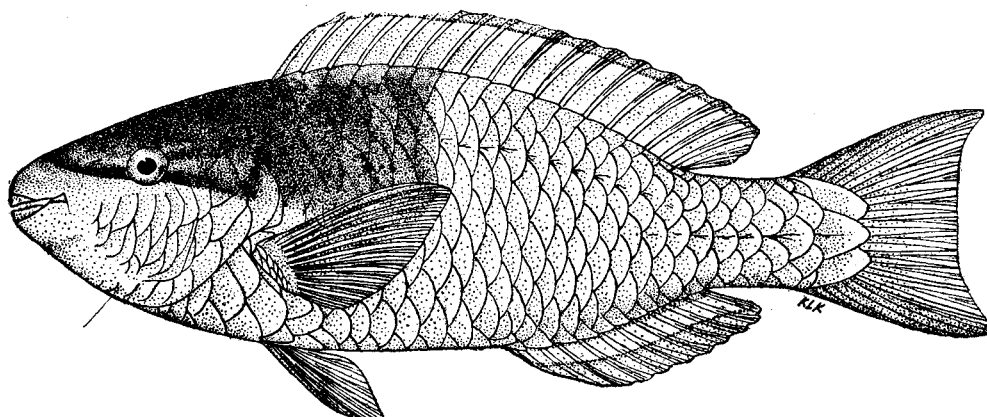


FIG. 418. *Callyodon pectoralis* (Valenciennes), 158 mm. (after Jones and Kumaran)

Local name: *Chandi* (Agathi).

Distribution: East coast of Africa, Red Sea and neighbouring islands to Seychelles, Laccadives, Indonesia and Philippines and eastward to Solomon, New Hebrides, Samoan and Society Islands.

419. *Callyodon janthochir* (Bleeker)

Scarus janthochir Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 139, 1853.

Callyodon janthochir de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 281, 1940. Smith, Ichth. Bull., 1, p. 14, 1956. Smith, Ibid., 16, p. 279, 1959. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 394, fig. 15, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/357).

Specimen studied: Bitra (1), 262 mm.

D. IX, 10; A. III, 9; P. ii, 13; V. I, 5. Ll. 24; Ltr. 2 + 1 + 6 $\frac{1}{2}$.

Head 3.2 in standard length, 4.0 in total length. Depth of body 2.65 in standard length, 3.30 in total length. Eye 7.2 in head, 2.6 in snout and 2.3 in convex interorbital space. Cheek with 2 rows of scales and 3 scales on preopercle flange. Teeth green, edges white, lips covering $\frac{1}{2}$ of dental plates, a rudimentary canine on one side. Nostrils small, close together and less than one eye diameter before eye. 6 scales before dorsal. Pectoral $\frac{3}{5}$ snout length shorter than head. Dorsal spines increasing in length to the last, it being $2\frac{1}{2}$ eye diameter and as long as dorsal rays. Caudal truncate, lobes slightly produced. Colour: Body bluish green, lighter below, some scales on caudal peduncle with a pale central spot, lower side of head below eye bright green, lips pale creamy continued as a band to eye, a broad bright green band extending forward from eye across snout, the region behind this being pale creamy. Edges of dorsal green, green bars along basal $\frac{2}{3}$ of spines, rays green, membrane between rays dark, subterminal part of the fin pale yellowish. Anal broadly edged with green, a green band along base and some greenish streaks on hind part, rest of the fin pale yellowish. Caudal green with a broad yellowish submarginal band along each lobe. Pectoral fin dark blue, outer margin pale. Ventral green with 1st and 2nd rays pale yellowish.

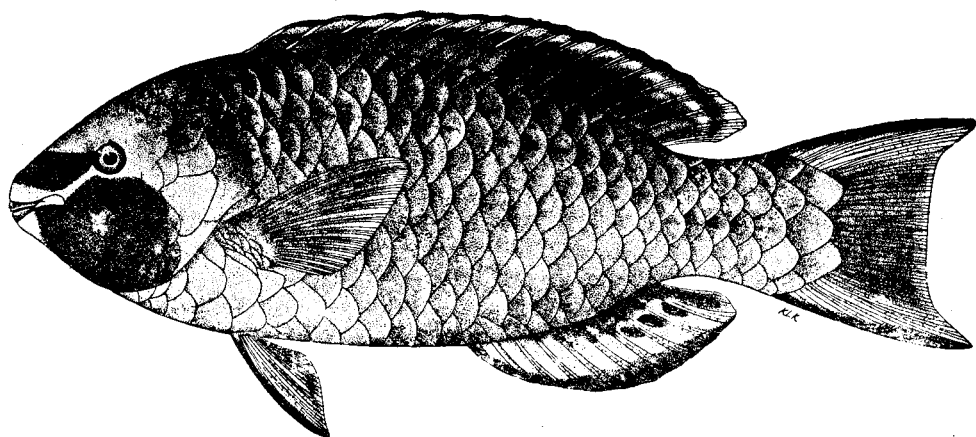


FIG. 419. *Callyodon janthochir* (Bleeker), 262 mm. (after Jones and Kumaran)

Local name: *Neela-chandi* (Bitra).

Distribution: Mauritius, Muscat, Persian Gulf and Laccadives, Indonesia to the Philippines and Caroline Islands.

420. *Callyodon niger* (Forskål)

Scarus niger Forskål, Descript. Animal., p. 28, 1775.

Callyodon niger Smith, Ichth. Bull., 1, p. 13, pl. 43, C and G, 1956. Smith, Ibid., 16, p. 279, pl. 43, C and G, 1959. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 396, fig. 17, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 22, 1969 (Cat. No. CMFRI-LA-F. 70/358).

Callyodon nuchipunctatus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 283, 1940.

Specimen studied: Bitra (1), 235 mm.

D. IX, 10; A. III, 9; P. ii, 13; V. I, 5. Ll. 25; Ltr. 2+1+6½.

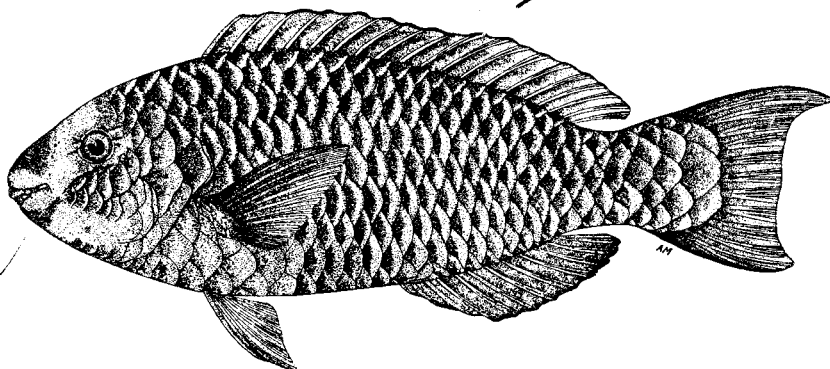


FIG. 420. *Callyodon niger* (Forskål), 235 mm. (after Jones and Kumaran)

Head 3.0 in standard length, 3.8 in total length. Depth of body 2.6 in standard length, 3.3 in total length. Eye 6.6 in head, 2.5 in snout and 2.4 in convex interorbital space. Cheek with 2 series of scales and 2 scales on preopercle flange. 6 predorsal scales. Teeth green, lips covering about 2/3 of dental plates, a rudimentary canine posteriorly in upper jaw. Nostrils small, the hind one about ¼ eye diameter before eye. Dorsal spines subequal, about 2 eye diameter in length, rays slightly longer. Pectoral 2/3 length of snout shorter than head. Caudal truncate, the lobes slightly produced. Colour: Dark brown. Both lips pale greenish, cheek lighter, a dark bar from below lower lip to behind rictus continued as a pale band below eye and pale streaks extending forward and backward from eye. Dorsal and anal dark brown and narrowly edged with green. Caudal dark brown, hind border slightly lighter. Pectoral brown, posterior edge lighter. Ventral brown, spine and extremity of rays slightly greenish.

Local name: *Karutha-chandi* (Bitra).

Distribution: East coast of Africa and Red Sea to Seychelles, Laccadives, Indonesia, Philippines, China, Ryukyu Islands, Japan and Palau, Fiji, Society, Gilbert, Kingsmill and Tuamotu Islands.

421. *Callyodon sexvittatus* (Rüppell)

Scarus sexvittatus Rüppell, Neue Wirbelt, Fische Rothen Meeres, p. 26, 1835.

Scarus rubroviolaceus Bleeker, Verh. Bat. Gen. 22, Gladschub. Labroid., p. 52, 1849.

Callyodon rubroviolaceus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 296, 1940. Smith, Ichth. Bull., 1, p. 11, pl. 43, J, 1956.

Callyodon sexvittatus Smith, Ichth. Bull., 16, p. 270, fig. 2 and pl. 41, H and I, 1959. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 399, fig. 20, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 70/359).

Callyodon (Scarops) rubroviolaceus Smith, Ichth. Bull., 16, p. 278, pl. 43, J, 1959.

Callyodon upolensis Smith, Ichth. Bull., 1, p. 11, pl. 41, H and I, 1956.

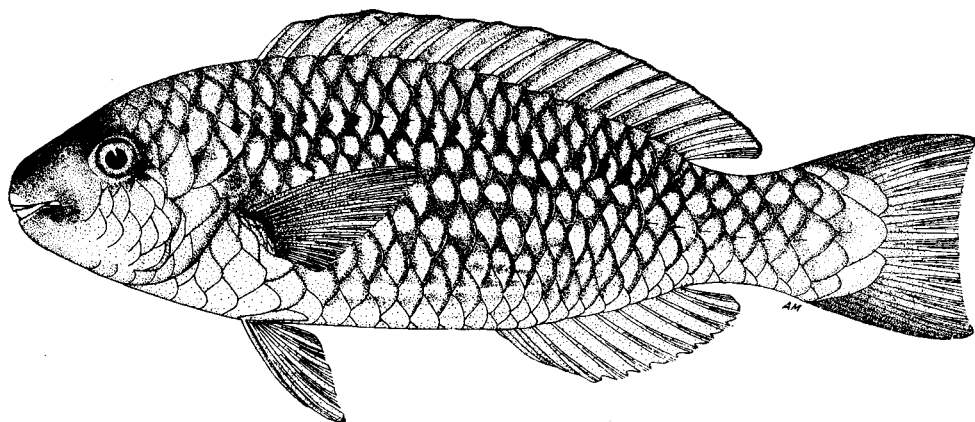


FIG. 421. *Callyodon sexvittatus* (Ruppell), 230 mm. (after Jones and Kumaran)

Specimens studied: Agathi (1), 230 mm. Ameni (3), 170 to 200 mm. Bitra (4), 225 to 305 mm. Minicoy (7), 155 to 220 mm.

D. IX, 10; A. III, 9; P. ii, 13; V. I, 5. Ll. 25-26; Ltr. 2 + 1 + 6½.

Head 3.0-3.2 in standard length, 3.6-4.0 in total length. Depth of body 2.9-3.0 in standard length, 3.6-3.8 in total length. Eye 5.5-6.7 in head, 2.0-2.6 in snout and 2.0-2.5 in convex interorbital space. Lips broad, covering more than half of dental plates, teeth whitish. Often 1-2 short posterior canines in upper jaw in large adults, always absent in juveniles. Nostrils small, adjacent, the anterior one with a low rim. Two rows of scales on cheek and two scales on flange. Six or seven scales before dorsal. Dorsal profile of snout almost straight in young, bluntly rounded and swollen with age. Dorsal spines subequal, about twice eye diameter; soft dorsal rays slightly longer. Pectoral longer than head without snout. Caudal rounded to truncate in juveniles, lobes slightly elongate in large adults. Colour: Brownish to reddish brown, scales on back and sides with dark hind border, some dark spots and streaks on sides forming horizontal bands. Dorsal pale yellowish to brownish, often with dusky outer edge. Anal yellowish. Pectoral hyaline, upper rays brownish. Caudal yellowish, dorsal and ventral sides darker. Ventral yellowish.

Local names: *Fehi-landae* (Minicoy). *Veesam* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Indonesia to the Philippines and Gilbert, Samoan, Society, Tuamotu and Hawaiian Islands.

Note: In the specimens examined by us, the snout is relatively longer, the dorsal profile of snout is almost straight in small specimens, becoming blunt and somewhat swollen anteriorly with age. Very often 1 or 2 short canines are present posteriorly in the upper jaw in large specimens, but are always absent in juveniles. Hence we are inclined to consider *Scarus rubroviolaceus* Bleeker as a synonym of *C. sexvittatus* (Rüppell).

422. *Callyodon ghobban* (Forskål)

Scarus ghobban Forskål, Descript. Animal., p. 28, 1775.

Callyodon ghobban de Beaufort, Fishes of the Indo-Australian Archipelago, **8**, p. 304, 1940. Munro, Fishes of Ceylon, p. 196, pl. 39, fig. 581, 1955. Smith, Ichth. Bull., **1**, p. 10, pl. 43, H, 1956. Balan, J. Bombay nat. Hist. Soc., **55**, p. 303, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 23, 1969 (Cat. No. CMFRI-LA-F. 70/360).

Pseudoscarus ghobban Day, Fishes of India, p. 412, 1878.

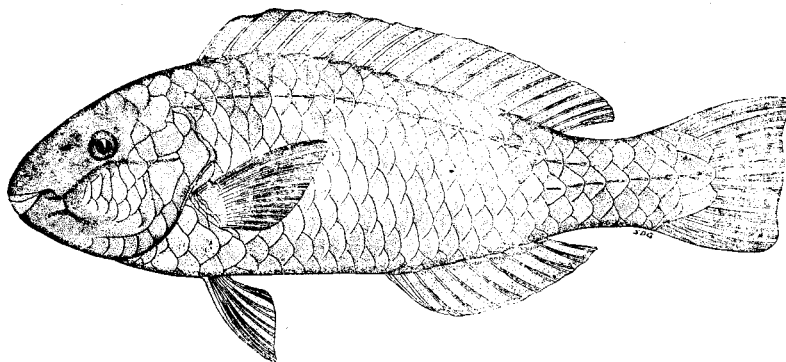


FIG. 422. *Callyodon ghobban* (Forskål), 295 mm.

Specimens studied: Agathi (4), 240 to 330 mm. Minicoy (3), 220 to 235 mm.

D. IX, 10; A. III, 9; P. ii, 13; V. I, 5. Ll. 25; Ltr. 2+1+6½.

Head 3.0-3.4 in standard length, 3.7-4.1 in total length. Depth of body 2.9-3.1 in standard length, 3.5-3.8 in total length. Eye 6.4-7.1 in head, 2.4-2.8 in snout and 2.1-2.4 in convex interorbital space. Lips rather broad, covering most of the plates, no canines, teeth white. Anterior nostril small, posterior larger, about 3/5 eye diameter before eye. Two rows of scales on cheek and one scale on flange. Six scales before dorsal. Dorsal spines flexible, subequal, about twice eye diameter or longer, rays slightly longer than spines. First anal spine minute, third longest, rays longer than third spine. Pectoral longer than head without snout. Caudal truncate, lobes somewhat produced in large adults. Colour: Rapidly fading on preservation; generally light orange to yellowish with bluish spots in centre of scales, a bluish band from eye to corner of mouth and a short one on chin. Dorsal yellowish with a bluish edge and sometimes with a row of bluish dark spots below. Anal yellowish with dark basal band and bluish edge.

Caudal pale with vertical rows of dark spots on rays, its dorsal and ventral margins bluish. Pectoral pale to yellowish, upper rays somewhat bluish. Ventral pale yellowish.

Local names: *Landae* (Minicoy). *Chandi* (Agathi).

Distribution: East coast of Africa and Red Sea to the Laccadives, coasts of India, Ceylon, Indonesia, Malaysia, China, Ryukyu Islands, Japan and Marianas, Tahiti and Gilbert Islands and south to Queensland.

423. *Callyodon scaber* (Valenciennes)

Scarus scaber Cuvier and Valenciennes, Hist. Nat. Poissons, 14, p. 239, 1839.

Callyodon scaber Smith, Ichth. Bull., 1, p. 10, pl. 31, G, 1956. Smith, Ichth. Bull., 16, p. 279, pl. 41, G, 1959. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 398, fig. 19, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 70/361).

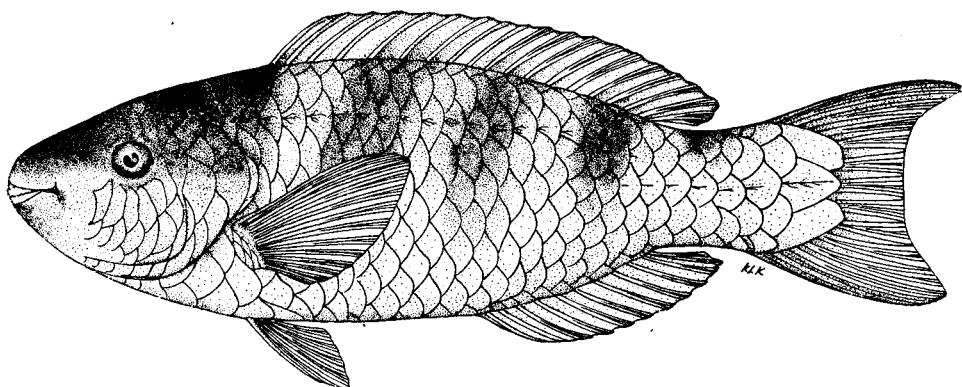


FIG. 423. *Callyodon scaber* (Valenciennes), 180 mm. (after Jones and Kumaran)

Specimens studied: Agathi (2), 158 and 180 mm. Kadamat (2), 160 and 172 mm. Minicoy (1), 168 mm.

D. IX, 10; A. III, 9; P. ii, 12 (13); V. I, 5. Ll. 24-25; Ltr. $2+1+6\frac{1}{2}$.

Head 2.9-3.2 in standard length, 3.6-3.9 in total length. Depth of body 2.5-2.8 in standard length, 3.2-3.5 in total length. Eye 5.8-6.4 in head, 2.2-2.6 in snout and 2.0-2.4 in slightly convex interorbital space. Teeth white, lips broad covering most of the plates, no canines. Two rows of scales on cheek and 2 or 3 scales on preopercle flange. Six or seven predorsal scales. Nostrils minute, adjacent, the posterior about $\frac{3}{5}$ eye diameter before eye. Pectoral about an eye diameter shorter than head. Dorsal spines subequal, 1.7-2.0 eye diameter, dorsal rays slightly longer than spines. Caudal truncate, the lobes slightly extended in adults. Colour: Light brownish grey above, becoming creamy white

below, upper side of snout darker. Five dark cross bars on back slightly slanting forward and merging with the creamy colour on sides. The first bar below origin of dorsal, the second about below 4th to 7th dorsal spines, the third about below 1st to 4th dorsal rays, the fourth below 6th to 10th dorsal rays and the fifth on caudal peduncle being sometimes obscure. Dorsal, anal and caudal pale yellowish, dorsal with slightly dusky outer edge, upper and lower edges of caudal sometimes slightly dusky. Pectoral and ventral yellowish.

Local names: *Gali-landae* (Minicoy). *Veesam* (other islands).

Distribution: East coast of Africa, Mauritius, Reunion and Seychelles in the Western Indian Ocean, Laccadives in the Central Indian Ocean and Philippines to Samoa and Hawaiian Islands in the Pacific.

Family CIRRHITIDAE

Body somewhat elongate and compressed. Mouth moderate, maxillary expanded behind, with bands of small teeth in jaws, often on vomer and sometimes on palatines. Preopercle often denticulate. Some of the lower pectoral rays simple. Scales cycloid; lateral line complete, almost straight. Three to six branchiostegals; pseudobranchiae present.

About 20 rows of small scales on cheek. Violet grey with numerous brown blotches on head and body. Median fins with brown spots

..... *Cirrhitus pinnulatus*

Five rows of large scales on cheek. Wide light yellowish band from pectoral to caudal and a deep brown band above. Head and often anterior third of back and pectoral base with reddish brown spots *Paracirrhites forsteri*

424. *Cirrhitus pinnulatus* (Bloch and Schneider)

Labrus pinnulatus Bloch and Schneider, Syst. Ichth., p. 264, 1801.

Cirrhichthys marmoratus Day, Fishes of India, p. 146, 1878.

Cirrhitus pinnulatus de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 2, fig. 1, 1940. Smith, Fishes of Southern Africa, p. 181, pl. 14, fig. 394, 1949. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 75/362).

Specimens studied: Agathi (9), 70 to 142 mm. Ameni (1), 123 mm. Bitra (1), 102 mm. Chetlat (3), 112 to 153 mm. Kavarathi (15), 41 to 100 mm. Minicoy (17), 81 to 110 mm.

D. X, 11; A. III, 6; P. 1+6+7; V. I, 5. Ll. 35-39; Ltr. 4+1+11-12.

Head 2.7-2.9 in standard length, 3.2-3.4 in total length. Depth of body 2.7-3.0 in standard length, 3.3-3.7 in total length. Eye 3.9-4.9 in head, 1.2-1.4 in snout and 0.7-0.9 in slightly concave interorbital space. Maxillary reaching almost to below hind border of iris. Anterior nostril with posterior fringed flap.

A row of pointed teeth in the jaws, those at the symphysis in the upper jaw canines and two or three canines on sides anteriorly in the lower jaw, and a patch of villiform teeth near symphysis in upper and lower jaws. Vomer with a patch of small teeth and a row of teeth on palatines. Preopercle with about 20 rows of minute scales. Hind border of preopercle denticulated. Fourth, fifth and sixth dorsal spines subequal, about $1\frac{1}{2}$ diameter of eye. Second anal spine longer and stronger than the other two, about twice diameter of eye. Pectoral half eye diameter longer than postorbital length of head. Ventral equal to postorbital length of head. Colour: Violet grey, lower sides lighter, with numerous brown blotches on head and body. Dorsal, anal and caudal with brown spots.

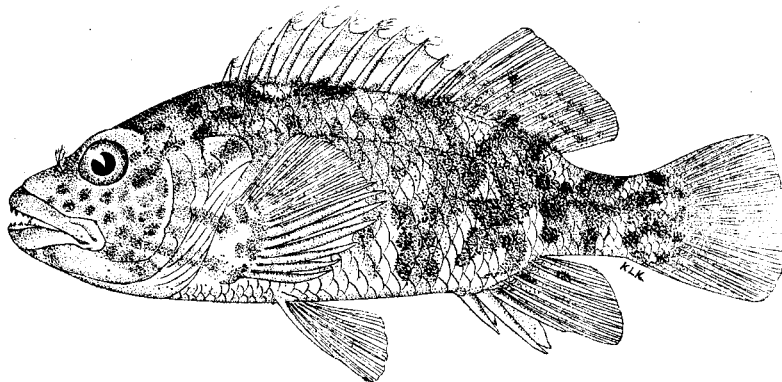


FIG. 424. *Cirrhitus pinnulatus* (Bloch and Schneider), 132 mm.

Local names: *Boffana* (Minicoy). *Chammam* (other islands).

Distribution: Widely distributed from the east coast of Africa, Red Sea, Laccadives, coasts of India, Indonesia, Philippines and Japan, eastwards to Marshall Islands, Hawaii, Tahiti and New Hebrides.

425. *Paracirrhites forsteri* (Bloch and Schneider)

Grammistes Forsteri Bloch and Schneider, Syst. Ichth., p. 191, 1801.

Cirrhitus Forsteri Day, Fishes of India, p. 144, pl. 35, fig. 4, 1878.

Paracirrhites forsteri de Beaufort, Fishes of the Indo-Australian Archipelago, 8, p. 5, fig. 2, 1940. Smith, Fishes of Southern Africa, p. 181, pl. 14, fig. 395, 1949. Munro, Fishes of Ceylon, p. 198, pl. 39, fig. 588, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 75/363).

Specimens studied: Bitra (8), 78 to 82 mm. Kadamat (1), 74 mm. Kalpeni (4), 70 to 93 mm. Minicoy (14), 49 to 98 mm.

D. X, 11; A. III, 6; P. 1+6+7; V. I, 5. Ll. 43-46; Ltr. 5+1+11-12.

Head 2.7-3.0 in standard length, 3.4-3.7 in total length. Depth of body 2.8-3.1 in standard length, 3.4-3.8 in total length. Eye 4.3-5.0 in head, 1.2-1.4 in snout and 0.8 in almost flat interorbital space. Anterior nostril with a fringed posterior flap. Maxillary reaching nearly to below hind border of iris. A single

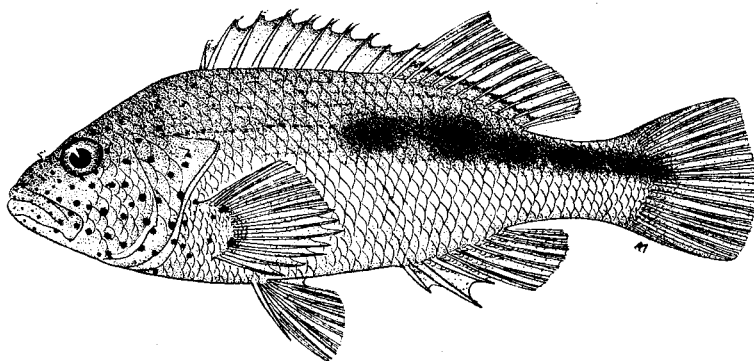


FIG. 425. *Paracirrhites forsteri* (Bloch and Schneider), 75 mm.

row of teeth in jaws, two canines near symphysis in upper jaw and two or three on sides in lower jaw canines; a band of villiform teeth within the outer row near symphysis in jaws. A small patch of teeth on vomer; palatines edentulous. Preopercle with 5 rows of large scales. Hind border of preoperculum denticulated. Fourth or fifth dorsal spine longest, about $1\frac{1}{2}$ diameter of eye. Second anal spine longer than the other two, about twice eye diameter. Pectoral half eye diameter longer than postorbital length of head. Ventral equal to postorbital length of head. Colour: Brownish yellow with a wide light yellowish band from above base of pectoral to base of caudal and a deep brown band above this from below last two dorsal spines to base of caudal. Head and sometimes also base of pectoral and anterior third of back with small reddish brown spots. Dorsal pale yellowish, spinous dorsal edged slightly dark and a dark sub-basal band on soft dorsal. Soft anal pale. Pectoral, ventral and caudal pale yellowish, outer rays of the latter narrowly dusky.

Local name: *Boh* (Minicoy).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Ryukyu, Marshall, Hawaiian and Society Islands.

Family PARAPERCIDAE

Body elongate, subcylindrical. Mouth protractile; villiform bands of teeth in jaws with some of the lateral teeth caninoid; teeth present on vomer and sometimes on palatines. Gill membranes free from isthmus. Six branchiostegals. Pseudobranchiae present. Dorsal fin long, with or without spines anteriorly.

Ventrals with one spine and five branched rays. Scales ctenoid or cycloid. Lateral line complete.

Dorsal with four spines. Head with large dark spots, a blotch near angle of preopercle with three light oblique lines; nine or ten blackish spots on sides with dark cross bands uniting one another above lateral line

..... *Parapercis quadrispinosa*

Dorsal with five spines. Head completely spotted or with spots on top of head and lines obliquely backwards and downwards from eye; back with dark streaks and three rows of 7 or 8 elongate dark patches on sides and with 3-7 white edged spots below; a large black blotch on caudal fin

..... *Parapercis hexophthalma*

426. *Parapercis quadrispinosa* (Weber)

? *Bodianus tetracanthus* Lacepede, Hist. Nat. Poissons, 4, p. 285 and 302, 1802.

Percis tetracanthus Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 458, 1853. Alcock, Journ. Asiat. Soc. Bengal, 65, p. 316, 1896.

Percis quadrispinosus Weber, Siboga Exped., 57, Fische, p. 519, 1913.

Parapercis quadrispinosa de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 15, 1951. Munro, Fishes of Ceylon, p. 198, pl. 40, fig. 589, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 73/364).

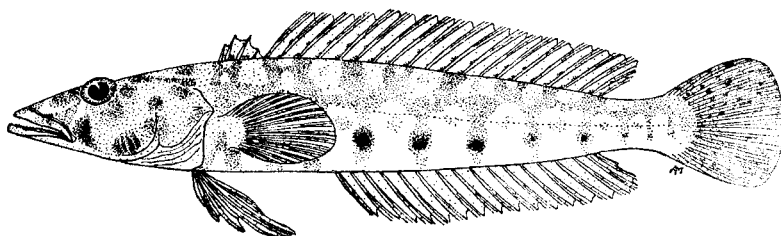


FIG. 426. *Parapercis quadrispinosa* (Weber), 130 mm.

Specimens studied: Agathi (1), 64 mm. Ameni (4), 56 to 130 mm. Bitra (1), 119 mm. Chetlat (4), 59 to 63 mm. Kavarathi (3), 107 to 116 mm. Kiltan (1), 90 mm. Minicoy (7), 115 to 117 mm.

D. IV, 21; A. i, 17; P. ii, 15-16; V. I, 5. Ll. 60-63; Ltr. 6+1+13-14.

Head 3.1-3.5 in standard length, 3.7-4.1 in total length. Depth of body 5.3-6.0 in standard length, 6.3-7.2 in total length. Eye 4.6-5.2 in head, 1.4-1.7 in snout and 0.4 in interorbital space. Maxillary reaching below anterior part of eye. Jaws with a villiform band of teeth anteriorly and an outer row of larger teeth, those near the symphysis caninoid. Vomer with a band of villiform teeth. Third dorsal spine equal to or slightly longer than second, about equal to eye;

4th dorsal spine much shorter. Middle rays of dorsal longest, a little longer than snout; anal rays slightly shorter than those of dorsal. Pectoral equal to or slightly shorter than head without snout; ventral equal to or longer than pectoral. Caudal somewhat rounded. Colour: Fresh specimens whitish, head with large dark spots, a blotch near angle of preopercle with 3 light oblique lines; 9-10 blackish spots on sides; corresponding to the spots dark cross bands present uniting one another above the lateral line. Dorsal and anal hyaline; soft dorsal with a basal row of blackish spots, a median row of dusky spots and a sub-marginal dusky line. Pectoral and ventral light. Caudal pale with a white area distally surrounded by dark spots.

Local names: *Sudung* (Minicoy). *Valakka* (other islands).

Distribution: Laccadives to Ceylon, Bay of Bengal, Andamans, Indonesia, Philippines and Ryukyu, Marshall, Fiji, Samoan and Society Islands.

427. *Parapercis hexophthalma* (Cuvier)

Percis hexophthalma Cuvier and Valenciennes, Hist. Nat. Poissons, 3, p. 202, 1829. Day, Fishes of India, p. 263, pl. 57, fig. 4, 1878.

Parapercis hexophthalma Smith, Fishes of Southern Africa, p. 177, pl. 13, fig. 380, 1949. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 24, 1951. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 73/365).

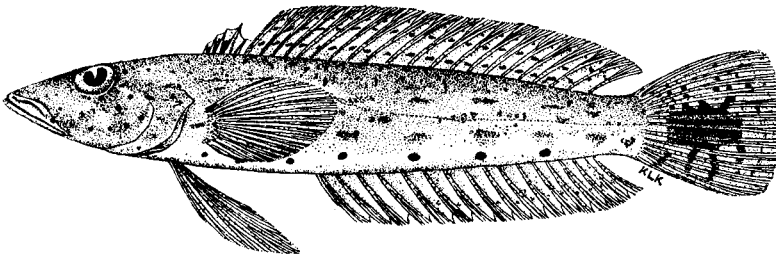


FIG. 427. *Parapercis hexophthalma* (Cuvier), 135 mm.

Specimens studied: Agathi (1), 159 mm. Kavarathi (1), 135 mm. Minicoy (5), 86 to 178 mm.

D. V, 21; A. i, 17; P. ii, 15; V. I, 5. Ll. 62-65; Ltr. 8+1+17-18.

Head 3.4-3.6 in standard length, 4.2-4.4 in total length. Depth of body 5.3-5.7 in standard length, 6.3-6.9 in total length. Eye 4.4-4.9 in head, 1.4-1.7 in snout and 0.6-0.7 in flat interorbital space. Maxillary reaching below front part of eye. Teeth in jaws in villiform bands, the outer row larger, some of the lateral teeth caninoid in both jaws. Vomer with several rows of teeth. Fourth dorsal spine longest, as long as eye diameter; fifth spine much shorter than fourth. Middle dorsal and anal rays longest, equal to postorbital length of head.

Pectoral longer than head without snout, ventral slightly longer but shorter than head. Caudal truncate, upper ray a little prolonged in large specimens. Colour: Reddish brown, lighter below; males with blackish spots on top of head and lines obliquely backwards and downwards from eye while in females the head completely spotted. Back with oblique irregular dark streaks and 3 rows of 7 or 8 elongate dark patches on sides, the lower row sometimes appearing as indistinct dark cross bands. Below these, in males 3 black spots edged white on sides of tail and in females 6 or 7 similar spots on trunk and tail. A black spot at base of first dorsal; second dorsal with 3 rows of blackish spots and a submarginal narrow dark band; anal with a single row of blackish spots. A large black blotch on caudal fin surrounded by blackish spots. Pectoral and ventral creamy, the former with a dark oblique streak at base.

Local names: *Sudung* (Minicoy). *Valakka* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Indonesia to the Philippines, China, Japan, Queensland and eastwards to Solomon, New Hebrides and Society Islands.

Family TRICHONOTIDAE

Body elongate and generally scaled with distinct lateral line. Mouth large, teeth feeble. A single dorsal fin along most of the back, sometimes with a few anterior rays spiniform. Ventrals present or absent.

428. *Chalixodytes tauensis* Schultz

Chalixodytes tauensis Schultz, Bull. U.S. Nat. Mus., 180, p. 263, fig. 24, 1943. Ibid., Bull. 202, 2, p. 280, fig. 108, 1960. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 9, fig. 10, 1967. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 71/366).

Chalixodytes chameleontoculis Smith, Ann. Mag. Nat. Hist., (12) 9, p. 980, fig. 1, 1956.



FIG. 428. *Chalixodytes tauensis* Schultz, 41 mm. (after Jones and Kumaran)

Specimens studied: Kalpeni (2), 40 and 41 mm.

D. 39-40; A. 38; P. 12; V. I, 4. Ll. 58.

Body elongate, moderately compressed. Head 4.8-5.0 in standard length, 5.3-5.5 in total length. Depth of body 10.0-10.6 in standard length, 11.0-11.8 in total length. Eye small, high up on dorsal profile; interorbital space narrow.

A row of cirri along the edges of lower jaw. Gill openings wide, gill membranes free from isthmus. Mouth horizontal, maxillary extending $2/3$ eye diameter behind a level from hind border of eye. Snout fleshy, projecting beyond the lower jaw. Anterior nostril tubular behind middle of snout. Teeth in jaws villiform, a few teeth on palatines. Opercular membrane elongate and flap-like covering base of pectoral. Origin of dorsal opposite to that of anal, one head length behind head. Pectoral as long as half length of head. Ventral less than half length of pectoral, mid-ray longest. Lateral line median anteriorly and running downwards posteriorly and ending at lower edge of base of caudal fin. Scales large, present along lateral line, posterior part of tail and a row along predorsal; other parts naked. Colour: Translucent in life and yellowish white on preservation.

Distribution: Previously known only from Samoan and Marshall Islands in the Pacific and Seychelles in the Western Indian Ocean. Recently recorded from the Laccadives (Kalpeni).

Note: Smith (1956) described *Chalixodytes chameleontoculis* based on a single specimen from Denis Island, Seychelles. The differences between the above and *Chalixodytes tauensis* Schultz as pointed out by him are so slight that we unite the two. Smith and Smith (Fishes of Seychelles, p. 45, 1963) have listed *Chalixodytes chameleontoculis* from Seychelles. However, pl. 36, fig. N referred is not of that species, but *Limnichthys nitidus* Smith, 1958.

Family CHAMPSODONTIDAE

Body elongate and compressed. Mouth large with villiform teeth and depressible outer canines. Vomer with teeth. Two dorsal fins, the first with a few spines and the second with one spine and several rays. Anal with one spine and several rays, its base almost as long as the second dorsal. Origin of ventral in front of a level from the base of pectorals. Head and body covered with minute granular scales. Two lateral lines with transverse branches.

429. *Champsodon capensis* Regan

Champsodon capensis Regan, Trans. Linn. Soc. London, **12**, part 3, p. 244, 1908. Smith, Fishes of Southern Africa, p. 175, fig. 376, 1949. de Beaufort, Fishes of the Indo-Australian Archipelago, **9**, p. 3, fig. 1, 1951. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 23, 1969 (Cat. No. CMFRI-LA-F. 193/367).

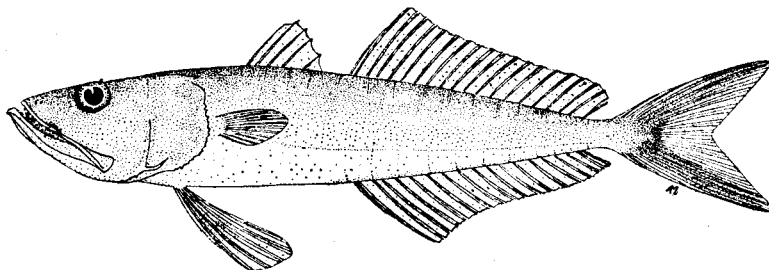


FIG. 429. *Champsodon capensis* Regan, 69 mm.

Specimen studied: Off Kavarathi (1), 69 mm.

D₁. V; D₂. I, 19; A. I, 18; P. ii, 10; V. I, 5.

Head 3.2 in standard length, 4.0 in total length. Depth of body 5.0 in standard length, 6.3 in total length. Eye 4.8 in head, 1.3 in snout and 0.7 in interorbital space. Mouth oblique, maxillary reaching beyond vertical through hind border of eye. A knob at symphysis of upper jaw with a notch on either side. Villiform bands of teeth in jaws with a row of longer, slender and depressible teeth. Two patches of teeth on vomer. Lower border of preorbital with two spines, a long spine at the angle of preopercle directed backwards, and two short points directed downwards on the lower border of preopercle. A pair of low ridges from top of snout passing backwards between interorbital space, diverging and ending in a spine above the upper edge of gill opening. Pectoral much shorter than postorbital length of head. Ventral equal to head without snout. Head and body covered with small granular scales. Lateral line double with several transverse branches. Colour: Plain brownish above becoming slightly lighter below. Caudal lobes slightly dusky, other fins hyaline.

Distribution: South-east Africa, Zanzibar, Laccadives, off the west coast of India, Bay of Bengal, Indonesia and Philippines.

Family SCHINDLERIIDAE

Body very much elongate and compressed. Mouth moderate, maxillary extending to below front of iris; two or three rows of minute teeth in jaws. Four gills; pseudobranchiae present. Dorsal and anal fairly long, opposed, the origin of the former sometimes before that of the latter. Dorsal and anal rays corresponding to the neural and haemal spines of the vertebrae. Ventrals absent. Body naked and translucent.

- D. 18-22. A. 11-14. Origin of anal below 7th to 11th ray of dorsal. Head 9.3-9.8 in total length. Preanal length about 1.6 in total length
 *Schindleria praematura*
 D. 17-18. A. 17. Origin of dorsal opposite to or slightly behind that of dorsal. Head 8.5-9.0 in total length. Preanal length about 1.8 in total length.
 *Schindleria pietschmanni*

430. *Schindleria praematura* (Schindler)

- Hemirhamphus praematurus* Schindler, Anz. Akad. Wiss. Wien, 9, p. 13, 1930. Bull. B.P. Bishop Mus., 97, p. 5, pl. 1, A, figs. 1 and 2, 1932.
Schindleria praematura Giltay, Bull. Mus. Royal Hist. Nat. Belgique, 10(13), p. 9, 1934.
 de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 456, 1951. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 258, figs. 2, a and b, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 195/384).
Schindleria praematurus Schultz, Bull. 202, U.S. Nat. Mus., 2, p. 396, pl. 121, A, 1960

Specimens studied: Chetlat (1), 15.9 mm. Minicoy lagoon (73), 13.0-90.5 mm. 73° 10', 10° 19' N (1), 11.7 mm. 72° 28' E, 11° 48' N (5), 14.0-15.4 mm. 72° 42' E, 10° 39' N (1), 15.3 mm.

D. 18-22; A. 11-14; P. 15-17.



FIG. 430. *Schindleria praematura* (Schindler), 20.1 mm. (after Jones and Kumaran)

Body elongate and compressed. Head 9.3-9.8 in total length. Eye about 4 in head and about equal to snout. Preanal length equal to or slightly more than 1.6 in total length. Teeth minute, in two or three rows in jaws. Origin of dorsal midway between tip of snout and end of caudal fin. 7-11 rays of dorsal anterior to a level from insertion of anal. Lower jaw slightly projecting beyond the upper. Maxillary reaching to below front of iris. All dorsal and anal rays simple. Caudal with 13 rays, all except the outer two branched. Ventrals absent. Air bladder indicated by a slightly pigmented area varying from 15th to 17th vertebrae. Vertebrae 35-39. Myomeres fairly discernible except the anterior two or three. Females generally attain larger size than males. Colour: Transparent.

Distribution: Hawaiian Islands, Tahiti, Samoa, New Guinea, Tasman Sea off Sydney and Grafton (Australia) and Bikini in the Pacific and Laccadive Sea and Mozambique channel in the Indian Ocean.

431. *Schindleria pietschmanni* (Schindler)

Hemirhamphus pietschmanni Schindler, Anz. Akad. Wiss. Wien, 1, p. 15, 1931. Bull. B.P. Bishop. Mus., 97, p. 7, pl. 1, B, figs. 1 and 2, 1932.

Schindleria pietschmanni Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 261, fig. 3 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 195/385).



FIG. 431. *Schindleria pietschmanni* (Schindler), 15.1 mm. (after Jones and Kumaran)

Specimens studied: Minicoy lagoon (4), 8.6-11.3 mm. 72° 26' E, 10° 46' N (1), 15.1 mm.

D. 17-18; A. 17; P. 15-16.

Body elongate and compressed and appearing slightly deeper in relation to standard length when compared to its congener. Head 8.5-9.0 in total length. Eye 3.7-3.8 in head and equal to or slightly more than snout. Preanal length about 1.8 in total length. Two or three rows of fine teeth in jaws. Origin of dorsal opposite to or slightly before a vertical from anal origin. Ventrals absent. Dorsal side of air bladder pigmented and situated below fourteenth or fifteenth vertebra. 35-37 vertebrae, 16-18 being preanal. Myomeres fairly discernible. Colour: Transparent.

Distribution: So far known only from the Hawaiian Islands in the Pacific and Laccadive Sea and Mozambique channel in the Indian Ocean.

Suborder BLENNIOIDEI

Body moderately elongate to eel-like, naked or partly naked. Gill openings wide or reduced to small apertures. Dorsal fin consisting of branched rays or with some anterior pungent or flexible spines or divided into 2 or 3 parts. Ventral fins jugular or mental, with 1-4 rays and sometimes a small hidden spine. Lateral line single, complete, incomplete or interrupted.

Body naked; one or two dorsal fins; dorsal spines flexible BLENNIIDAE

Body scaled; three dorsal fins, the first and second consisting of somewhat strong spines TRIPTERYGIONTIDAE

Family BLENNIIDAE

Moderately elongate to eel-like. Usually a single series of teeth in jaws, vomerine teeth sometimes present. A posterior canine sometimes present in the lower jaw. Gill openings often restricted. Dorsal fin long, spinous and soft portions sometimes separated by a notch, spines flexible. Caudal free, sometimes confluent with dorsal and anal. Anal long, with or without flexible spines in front. Ventrals jugular with one flexible spine and 2-4 rays.

1. Premaxilla with well developed pedicel. Teeth firm. Gill openings restricted or sometimes wide 2
Premaxilla with feeble pedicel; a bony ridge above upper lip. Teeth slender and movable. Gill openings wide 10
2. Body eel-shaped. More than 95 anal rays *Xiphasia setifer*
Body not eel-shaped. Less than 35 anal rays 3
3. Gill openings almost entirely above base of pectoral 4
Lower edge of gill opening opposite base of pectoral 6
4. A cirrus on eye. Lower canines strong and large. Ventrals I, 3. Short filaments on chin and preopercle margin 5
No cirrus on eye. Lower canines small. Ventrals I, 2. No nasal cirri or ciliate flap on lip *Omobranchus elongatus*

5. Depth of body less than 4. First three dorsal spines elevated. No blackish blotches on dorsal *Petroscirtes mitratus*
 Depth of body more than 5. Second dorsal spine slightly longer than the rest. Two blackish blotches on dorsal *Petroscirtes pindae*
6. Anal rays 19. Dorsal and anal fully confluent with caudal. Dark brown; lower part of head with 5 oblique dark blue stripes .. *Enchelyurus kraussi*
 More than 25 anal rays. Dorsal and anal not fully confluent with caudal, at most reaching base of caudal 7
7. Gill opening extending opposite to lower side of base of pectoral. Cirri present on chin. A blue band from snout to base of caudal and seven light cross bars on sides *Blennechis filamentosus*
 Lower edge of gill opening not extending to lower edge of base of pectoral 8
8. Less than 40 teeth in each jaw; teeth of both jaws subequal. Small upper canines present. Bluish black stripe increasing in breadth posteriorly on body and occupying almost the whole of caudal .. *Aspidontus tractus*
 More than 40 teeth in lower jaw, much smaller than those in upper. No canines in upper jaw 9
9. One interrupted blue stripe along side to median caudal ray and a narrow stripe from above mouth to below pectoral base
 *Runula tapeinosoma*
 Two horizontal whitish stripes on sides with bluish brown interspace between them *Runula rhinorhynchus*
10. A transverse row of cirri on nape. Body rather short 11
 No transverse row of cirri on nape. Body usually long 14
11. A pair of barbels on either side of throat. No canines. Numerous dark spots on head, body and fins *Exallias brevis*
 No barbels on side of throat. Canines present posteriorly in lower jaw 12
12. Head and body brown. Fins brown, pectoral and upper part of caudal lighter *Cirripectus variolosus*
 Colour not as above 13
13. Brown with 8-14 dark brown vertical bars on sides, throat and breast with numerous pale spots and reticulations *Cirripectus sebae*
 Light brown with about 13 dark brown vertical bars on sides, two dark brown streaks below eye and another on gill membranes
 *Cirripectus quagga*
 Dark brown to blackish; no dark vertical bars on sides; roundish pale spots on sides of head, throat and breast; posterior part of body sometimes with numerous vertical or oblique white lines ... *Cirripectus stigmaticus*
14. Teeth present on vomer 15
 No teeth on vomer 16

15. Pale yellowish with 5-6 pale vertical stripes on sides and dark spots; caudal with more than four dark transverse bands *Entomacrodus striatus*
 Pale yellowish to brown with dark brown reticulations on body; caudal rays with brown spots *Entomacrodus vermiculatus*
16. Usually XII dorsal spines. Ventrals I, 2. Front anal rays of male longer. Supraorbital cirrus usually with 2-3 cilia. Nasal cirrus with about 5 short filaments. Brown with 7-8 reticulated dark bars and oval light blotches on sides *Salarias fasciatus*
 XIII dorsal spines. Ventrals I, 3 17
17. Orbital cirrus with filaments on either side. 6 prominent narrow black stripes on sides, the upper 1-3 irregular, running obliquely upwards or breaking up into spots *Istiblennius lineatus*
 Orbital cirrus without filaments on sides 18
18. Lips smooth. No canines. 6-7 dark double transverse bars on sides or with dark brown spots on posterior part of body and caudal peduncle *Istiblennius edentulus*
 Upper lip crenulate. A short posterior canine in lower jaw. Indistinct vertical bars on sides and two rows of dark spots or with small spots over posterior part of body *Istiblennius periophthalmus*

432. *Xiphasia setifer* Swainson

Xiphasia setifer Swainson, Nat. Hist. Animals, Fishes, 2, p. 259, 1839. Day, Fishes of India, p. 337, pl. 73, fig. 1, 1878. Smith, Fishes of Southern Africa, p. 346, pl. 82, fig. 964, 1949. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 381, fig. 54, 1951. Kuthalingam and Menon, J. Mar. biol. Ass. India, 7, p. 214, 1965. Menon and Verma, J. Bombay nat. Hist. Soc., 60, p. 753, figs. 1 and 2, 1966.

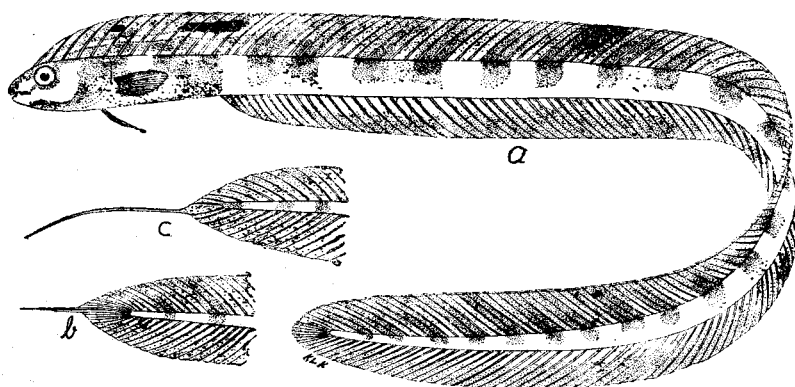


FIG. 432. *Xiphasia setifer* Swainson, (a) 350 mm. (b) caudal portion of 356 mm. specimen. (c) Caudal portion (after Day)

D. 120-126; A. 105-116; P. 13; V. 3.

Body elongate, slightly compressed. Head 13.5-13.8 in standard length, 13.9-14.8 in total length. Depth of body 29-31 in standard length, 29.7-32.2 in total length. Eye 3.4-4.2 in head, about equal to snout and 0.6-0.7 in almost flat interorbital space. A single series of slender incisiviform teeth in jaws and a small canine posteriorly in upper and a long curved canine posteriorly in lower jaw. Gill openings restricted, its lower edge slightly above a horizontal from middle ray of pectoral. Dorsal and anal very long and confluent with caudal. Dorsal origin over front border of eye; origin of anal slightly more than a head length behind head. Ventrals jugular. A few front dorsal rays as long as head, rays gradually becoming shorter posteriorly. Pectoral equal to postorbital length of head. Ventral equal to or slightly longer than pectoral. Lateral line indistinct, running along upper half of sides and disappearing on tail. Colour: Yellowish grey with 25-26 broad brownish cross bands on sides, the bands extending on to the dorsal fin. A black spot distally between fifth and sixth dorsal rays and a diffuse elongate blotch between 10th and 14th or 15th dorsal rays. Anal yellowish grey, slightly dusky distally. Pectoral and ventral yellowish grey.

Distribution: Coast of Natal, Madagascar, Laccadives, coasts of India, Indonesia to the Philippines, north to Japan and to New South Wales, New Hebrides and Lord Howe Island.

Note: A specimen collected from Minicoy was lost inadvertently. The description is based on four specimens, two measuring 328 and 350 mm. obtained at Mandapam Camp and two measuring 244 and 356 mm. from Mangalore recorded by Kuthalingam and Menon (1965). It is observed from the descriptions of several authors that the caudal filament and the black markings on the dorsal fin are either lacking or variably developed. The two median caudal rays are not produced in the specimens obtained at Mandapam Camp, while it is moderately developed, about equal to head length in the specimen measuring 356 mm. (fig. 432 b) collected from Mangalore (Kuthalingam and Menon, 1965), but the black markings anteriorly on the dorsal are present in all. The caudal filament in the figure presented by Day (1878) is about twice head length (fig. 432 c).

433. *Omobranchus elongatus* (Peters)

Petrosirtes elongatus Peters, Monatsber. Akad. Berlin, p. 249, 1855.

Omobranchus elongatus Smith, Ichth. Bull., 14, p. 232, pl. 17, fig. 1 and pl. 19, F, 1959.

Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 116, fig. 10, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 118/368).

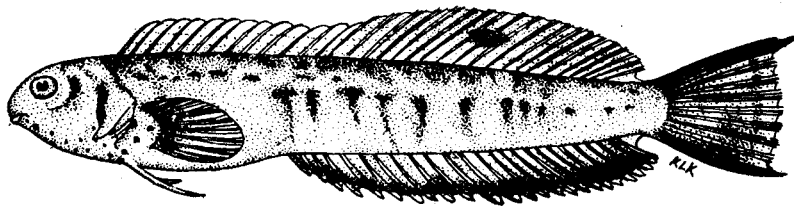


FIG. 433. *Omobranchus elongatus* (Peters), 40 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (3), 40 to 46 mm.

D. XIII-XIV, 18-20; A. II, 21-23; P. 13; V. I, 2.

Head 4.6-4.9 in standard length, 5.5-5.7 in total length. Depth of body 5.6-5.8 in standard length, 6.6-6.9 in total length. Eye 3.5-3.8 in head and 0.7 in interorbital space. Canines in lower jaw longer and stronger than those in upper. Last dorsal and anal rays joined to caudal peduncle by membrane. Pectoral a little longer than ventral, equal to or shorter than head. Upper and lower rays of caudal often slightly produced. Colour: Yellowish brown with angular cross bars and spots along sides of body. Black spots on throat and at base of pectoral and blackish bars behind eye and on opercle. Soft dorsal with dark blotch on middle rays and four or five longitudinal dark lines.

Local names: *Digu-funna*, *Hima-kattu* (Minicoy).

Distribution: East coast of South Africa, Aldabra and Seychelles in the Western Indian Ocean and Laccadives in the Central Indian Ocean.

434. *Petroscirtes mitratus* Rüppell

Petroscirtes mitratus Rüppell, Atlas Reise Nordl. Afrika, Fische Rothen Meeres, p. 111, pl. 28, fig. 1, 1828. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 367, 1951. Smith, Ichth. Bull., 14, p. 231, pl. 19, M, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 118/369).

Petroscirtes lienardi Day, Fishes of India, p. 327, pl. 69, fig. 8, 1878. Munro, Fishes of Ceylon, p. 201, pl. 40, fig. 596, 1955.

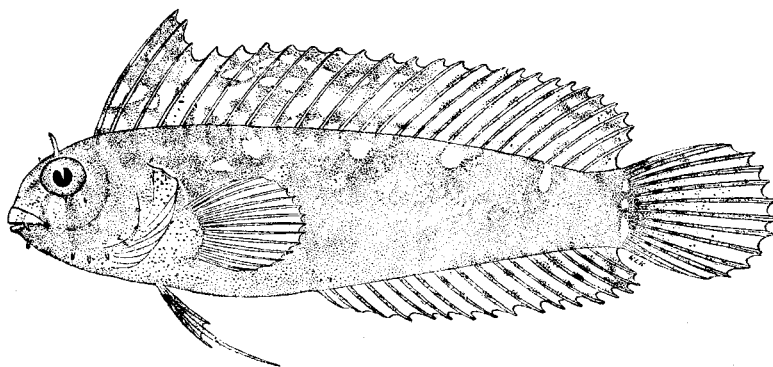


FIG. 434. *Petroscirtes mitratus* (Rüppell), 54 mm.

Specimens studied: Minicoy (28), 24 to 57 mm. Suheli (2), 44 and 55 mm.

D. XI, 14-15; A. II, 14-15; P. (14) 15; V. I, 3.

Head 3.7-4.3 in standard length, 4.6-5.2 in total length. Depth of body 3.6-3.9 in standard length, 4.4-4.8 in total length. Eye 3.4-3.8 in head, inter-orbital space about two thirds of eye. Gill opening an oblique slit above base of pectoral. Pectoral as long as head without snout. A large canine in lower jaw and a small one in the upper jaw. Cirrus above eye flattened or ciliate. Small skinny tentacles behind eye, over opercle, along lower preopercle margin, at nape and on chin. Nasal cirrus small. First three spines longer than others and separated by a notch from the rest of the fin. Last dorsal and anal rays joined to caudal peduncle by membrane. Colour: Brown with two irregular rows of white patches along sides. Dorsal and anal hyaline with dark markings. Pectoral hyaline. Ventral brownish. Caudal hyaline, rays with brownish spots.

Local name: *Diela-hikkae* (Minicoy).

Distribution: East coast of Africa, Red Sea and neighbouring islands, Laccadives, coasts of India, Ceylon, Indonesia to the Philippines, Caroline and Samoan Islands.

435. *Petroscirtes pindae* Smith

Petroscirtes pindae Smith, Ichth. Bull., 14, p. 231, pl. 17, fig. 4, 1959. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 116, fig. 11, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 118/370).

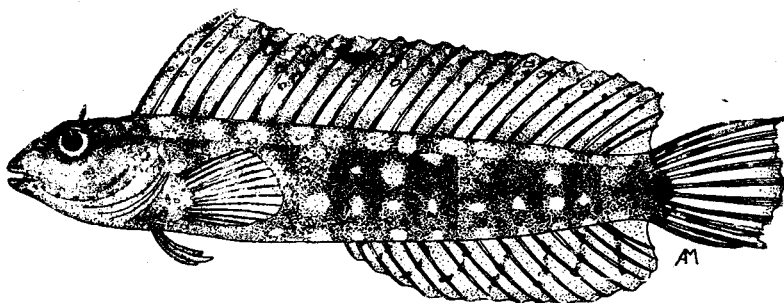


FIG. 435. *Petroscirtes pindae* Smith, 48 mm. (after Jones and Kumaran)

Specimens studied: Kiltan (1), 40 mm. Minicoy (3), 36 to 60 mm. Suheli (1), 37 mm.

D. XI, 15-16; A. II, 15; P. 14. V. I, 3.

Head 4.0-4.2 in standard length, 4.7-4.9 in total length. Depth of body 5.3-5.4 in standard length, 6.3-6.5 in total length. Eye 3.8 in head, equal to snout and about 0.7 in concave interorbital space. Lower canines strong and more than twice length of canines in upper jaw. Small flat tentacle above eye and tentacles present dorsolateral to eye, at nape and above opercle. Nasal cirrus simple and short. Small cirrus with short filaments on chin and 5-6 along

preopercle edge. Gill opening less than diameter of eye, just above and a little in front of pectoral base. Second dorsal spine longer than others. Pectoral 1.3 in head, ventral 2 in head. Upper caudal ray slightly produced. Colour: Light brownish with indications of 6-7 incomplete dark cross bars and light patches along sides. Membrane between 1st and 2nd dorsal rays and between 9th and 11th or 12th rays with blackish blotches near margin. Bluish white spots on distal half of dorsal. Some dorsal rays with brownish streaks basally and submarginal blackish spots. Anal pale yellowish with 7 rows of brownish spots and streaks. Pectoral and ventral pale yellowish. Caudal yellowish with pale streaks basally on rays.

Local name: *Diela-hikkae* (Minicoy).

Distribution: Known only from Pinda in the Western Indian Ocean and Laccadives in the Central Indian Ocean.

436. *Enchelyurus kraussi* (Klunzinger)

Petroscirtes Kraussi Klunzinger, Verh. Zool. bot. Ges. Wien, 21, p. 497, 1871.

Enchelyurus kraussi Smith, Ichth. Bull., 14, p. 234, pl. 18, J, 1959. Smith and Smith, Fishes of Seychelles, p. 50, pl. 37, C, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, 10, p. 326, fig. 6, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 118/521).

Petroscirtes kraussi de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 378, 1951.

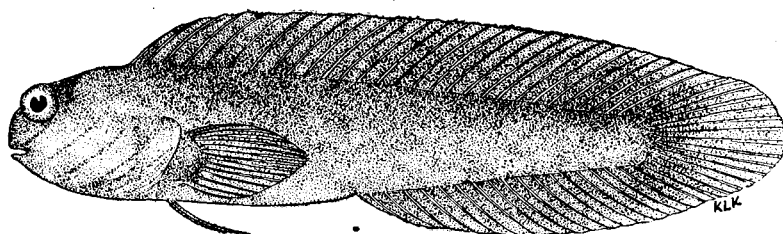


FIG. 436. *Enchelyurus kraussi* (Klunzinger), 26 mm. (after Jones and Kumaran)

Specimen studied: Minicoy (1), 26 mm.

D. 29; A. 19; P. 15; V. I, 2.

Head 3.7 in standard length, 4.4 in total length. Depth of body 4.3 in standard length, 5.1 in total length. Eye 3.7 in head and 0.6 in slightly convex interorbital space. Teeth in a single series in jaws; a strong canine on each side of lower jaw and a shorter canine on each side of upper jaw. Lower edge of gill opening opposite upper third of base of pectoral. Dorsal rays increasing in length posteriorly, hind rays equal to postorbital part of head. Anal rays slightly shorter than those of dorsal. Dorsal and anal fully confluent with caudal.

Pectoral equal to postorbital length of head and half eye diameter. Ventral shorter than pectoral. Caudal rounded. Lateral line along base of dorsal. Colour: Dark brown, lower part of head with five oblique dark blue stripes; fins brown, a pale longitudinal stripe on anal; pectoral pale hyaline.

Distribution: Red Sea, Malindi, Aldabra and Seychelles in the Western Indian Ocean and Laccadives and Indonesia.

437. *Blennechis filamentosus* Valenciennes

Blennechis filamentosus Cuvier and Valenciennes, Hist. Nat. Poissons, **11**, p. 280, 1836. Smith, Ichth. Bull., 14, p. 235, pl. 17, fig. 3, 1959. Smith and Smith, Fishes of Seychelles, p. 50, pl. 93, fig. 3, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 118/371).

Aspidontus filamentosus Smith, Fishes of Southern Africa, p. 346, pl. 21, fig. 961, 1949.

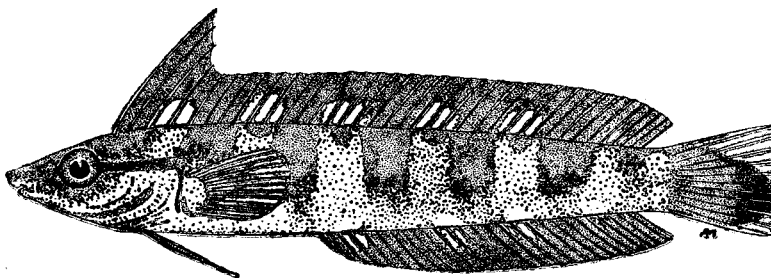


FIG. 437. *Blennechis filamentosus* Valenciennes, 43 mm.

Specimen studied: Chetlat (1), 43 mm.

D. XI, 27; A. II, 26; P. 14; V. I, 3.

Head 3.7 in standard length, 4.4 in total length. Depth of body 5.7 in standard length, 6.7 in total length. Eye 4 in head, slightly shorter than snout and equal to interorbital space. Mouth inferior. About 20 teeth in each jaw; a backwardly hooked canine on each side of lower jaw. Gill opening extending opposite to lower edge of base of pectoral fin. Dorsal origin behind a level from the hind border of eye. First three spines of dorsal notably elongate, as long as head, hind ones much shorter. Last ray of dorsal and anal attached very close to base of caudal fin. Pectoral equal to postorbital length of head plus half eye diameter. Ventral slightly longer than pectoral. Colour: Light brownish, lighter below; a blue band from snout through eye to base of caudal and seven light cross bars on sides extending on to basal part of dorsal and anal fins. Outer edges of caudal fin clear. Ventral brownish. Pectoral clear.

Distribution: East coast of Africa, Aldabra, Comoro Islands, Seychelles, Red Sea, Laccadives, Andamans, Indonesia and Japan.

438. *Aspidontus tractus* Fowler

Aspidontus tractus Fowler, Fish. Zanzibar, p. 170, 1903. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 115, fig. 9, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 118/372).

Aspidontus (aspidontus) tractus Smith, Ichth. Bull., 14, p. 235, pl. 17, fig. 14, 1959.

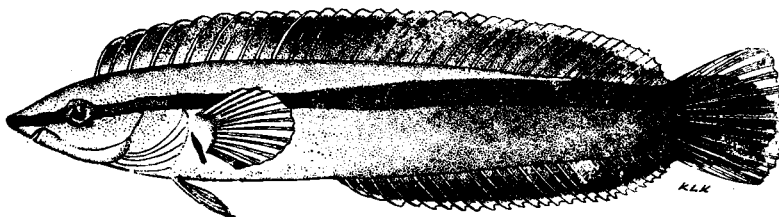


FIG. 438. *Aspidontus tractus* Fowler, 65 mm. (after Jones and Kumaran)

Specimens studied: Kadamat (1), 45 mm. Kavarathi (1), 78 mm. Minicoy (2), 60 and 65 mm.

D. XI, 27; A.II, 26; P. 14; V. I, 4.

Head 3.7 in standard length, 4.3 in total length. Depth of body 5.4 in standard length, 6.3 in total length. Eye 5.2 in head, 1.6 in snout and a little less than interorbital space. About 30 fixed teeth in each jaw, lower jaw with a canine on either side. Lower edge of gill opening above level of middle of pectoral base. Two pairs of small barbels on chin, those in female smaller than in the male. Dorsal and anal joined to base of caudal. Longest pectoral ray equal to postorbital length of head. Ventral equal to snout and eye together. Colour: Bluish violet, pale white on cheek and abdomen. A bluish black stripe from snout through eye to gill opening, broadening posteriorly towards posterior half of body and occupying almost the whole of caudal. Dorsal and anal dark, distal margin of fins white. Caudal broadly bordered above, below and posteriorly by white. A dark bar across lower part of base of pectoral. Pectoral and ventral white.

Local name: *Haran-kali* (Minicoy).

Distribution: East coast of South Africa, Aldabra, Zanzibar and Seychelles in the Western Indian Ocean and Laccadives in the Central Indian Ocean.

✓ 439. *Runula tapeinosoma* (Bleeker)

Petroskirtes tapeinosoma Bleeker, Acta Soc. Sc. Indo-Neerl., 2, Achtste bijdr. vischfauna Amboina, p. 64, 1857.

Aspidontus tapeinosoma Smith, Fishes of Southern Africa, p. 346, pl. 21, fig. 963, 1949.

Petroskirtes tapeinosoma de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 362, 1951.

Runula tapeinosoma Smith, Ichth. Bull., 14, p. 234, pl. 19, B, 1959. Smith and Smith, Fishes of Seychelles, p. 50, pl. 34, E, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 10, fig. 11, 1967. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 23, 1969 (Cat. No. CMFRI-LA-F. 118/373).

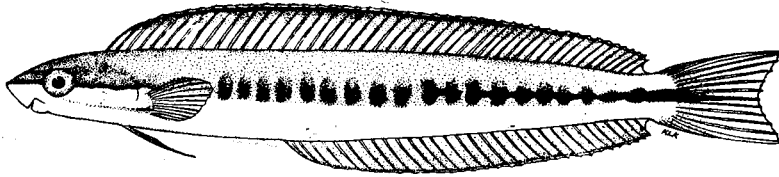


FIG. 439. *Runula tapeinosoma* (Bleeker), 46 mm. (after Jones and Kumaran)

Specimens studied: Kadamat (1), 40 mm. Minicoy (2), 42 and 46 mm.

D. 45-46; A. 30-32; P. 12. V. I, 3.

Head 4.8-5.0 in standard length, 5.7-5.9 in total length. Depth of body 6.8-7.0 in standard length, 8.0-8.2 in total length. Eye 3.8-4.0 in head, 1.0-1.2 in snout and 1.0-1.1 in interorbital space. Mouth inferior. Teeth small, about 40 in upper jaw; about 70 in lower jaw with a large backwardly hooked canine on each side. Lower edge of gill opening opposite to lower half of base of pectoral but not reaching to lowest rays. Origin of dorsal above hind border of preopercle. Last ray of dorsal and anal attached to caudal peduncle. Pectoral shorter than postorbital part of head with half eye diameter. Ventral equal to or slightly longer than pectoral. Caudal fin slightly emarginate. Colour: Back bluish, lower part of head and body pale yellowish; a blue stripe from snout through eye, broken into 23-25 vertical bars on midside of body, becoming narrower posteriorly and continued as a narrow stripe upto tip of median caudal ray and a narrow bluish stripe from above mouth to below base of pectoral. Dorsal and anal pale basally becoming bluish distally and with very narrow clear outer edge. Pectoral yellowish.

Distribution: East coast of South Africa, Red Sea and Seychelles in the Western Indian Ocean, Laccadives, Indonesia to Caroline, Samoan, Society and Marquesas Islands.

✓ 440. *Runula rhinorhynchus* (Bleeker)

Petroskirtes rhinorhynchus Bleeker, Nat. Tijds. Ned.-Ind., 3, p. 273, 1852.

Aspidontus rhinorhynchus Smith, Fishes of Southern Africa, p. 346, pl. 21, fig. 962, 1949.

Petroskirtes rhinorhynchus de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 361, 1951.

Runula rhinorhynchus Smith, Ichth. Bull., 14, p. 234, pl. 17, fig. 7, 1959. Smith and Smith, Fishes of Seychelles, p. 50, pl. 93, fig. 7, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 11, fig. 12, 1967. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 117/374).

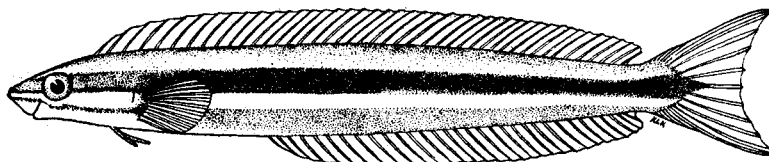


FIG. 440. *Runula rhinorhynchus* (Bleeker), 48 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (3), 31 to 48 mm.

D. 44-45; A. 31-33; P. 12; V. I, 3.

Head 4.8-5.1 in standard length, 5.8-6.1 in total length. Depth of body 6.5-6.7 in standard length, 7.6-8.0 in total length. Eye 4.0 in head, 1.0-1.1 in snout and also in interorbital space. Mouth inferior. Teeth in upper jaw about 40; about 70 teeth in lower jaw with a backwardly hooked large canine on each side. Gill opening much shorter than diameter of eye, extending opposite to middle rays of pectoral. Origin of dorsal above hind border of preopercle. Pectoral equal to postorbital length of head plus $\frac{1}{3}$ eye diameter. Ventral slightly longer than half length of pectoral. Caudal emarginate. Colour: Preserved specimens brown, slightly lighter below; two horizontal whitish bands from snout to base of caudal fin, the interspace between them broad and bluish brown. Fins pale yellowish; base of pectoral dark.

Distribution: East coast of South Africa, Aldabra, Seychelles, Laccadives, Indonesia, Philippines, Palau Islands and New Hebrides.

441. *Exallias brevis* (Kner)

Salarias brevis Kner, Sitzb. Akad. Wiss. Wien, 58, p. 42, pl. 6, fig. 18, 1868.

Cirripectus leopardus Chapman (in Weber and de Beaufort), Fishes of the Indo-Australian Archipelago, 9, p. 247, fig. 43, 1951. Munro, Fishes of Ceylon, p. 203, pl. 40, fig. 599, 1955.

Exallias brevis Smith, Ichth. Bull., 14, p. 237, pl. 17, figs. 11 and 12, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/375).

Salarias leopardus Day, Fishes of India, p. 325, pl. 68, fig. 6, 1878.

Specimens studied: Ameni (1), 42 mm. Minicoy (1), 43 mm.

D. XII, 13; A. II, 14; P. 15; V. I, 5.

Head 3.0-3.1 in standard length, 3.8-3.9 in total length. Depth of body 2.8-2.9 in standard length, 3.5-3.7 in total length. Eye 3.4-3.6 in head, 0.6 in

snout and a little more than interorbital space. Lips crenulate. Nasal cirrus with 5-6 filaments. Supraorbital tentacle flat with a few short filaments. A fringe of about 30 cirri in a transverse row across nape. A pair of small barbels on lower side of throat. Pectoral a little shorter than head. Spinous dorsal higher than soft dorsal. Anal lower than soft dorsal. Colour: Pale yellowish brown with numerous small dark spots on head, body and all fins.

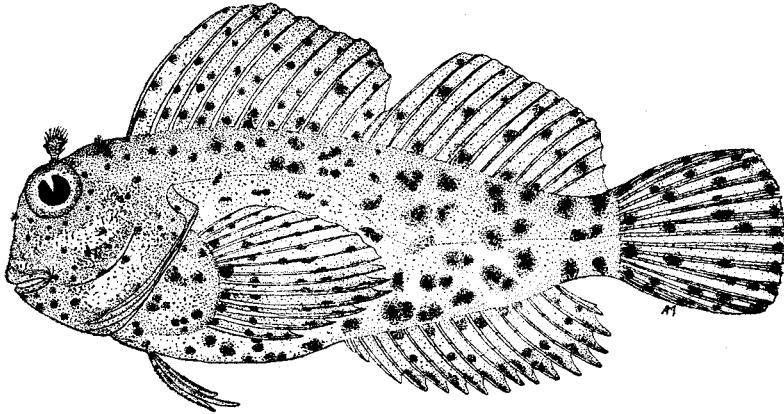


FIG. 441. *Exallias brevis* (Kner), 43 mm.

Local names: *Bok* (Minicoy). *Fulli-kakkadan* (Ameni).

Distribution: East coast of Africa and neighbouring islands to the Laccadives, coasts of India, Ceylon, Indonesia and Marshall, Samoan and Hawaiian Islands.

442. *Cirripectus variolosus* (Valenciennes)

Salarias variolosus Cuvier and Valenciennes, Hist. Nat. Poissons, **11**, p. 317, pl. 330, 1836.

Cirripectus variolosus de Beaufort and Chapman, Fishes of the Indo-Australian Archipelago, **9**, p. 249, 1951. Smith, Ichth. Bull., **14**, p. 238, pl. 19, L, 1959. Jones and Kumaran, J. Mar. biol. Ass. India, **10**, p. 326, fig. 7, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/522).

Specimens studied: Ameni (6), 34 to 52 mm. Minicoy (4), 30 to 55 mm.

D. XII, 14-15; A. II, 15-16; P. 15; V. I, 4.

Head 3.3-3.5 in standard length, 4.0-4.2 in total length. Depth of body 3.2-3.4 in standard length, 3.9-4.1 in total length. Eye 3.8-4.2 in head, 0.5 in blunt snout and 0.4 in interorbital space. Nasal cirrus with 4-6 filaments. Supraorbital cirrus with 3-5 filaments arising from a fleshy base. A row of 32-36 cilia across nape. Upper lip weakly crenulate. Lower lip weakly crenulate in posterior quarter. Teeth in jaws numerous, movable. A canine present posteriorly on each side of lower jaw. Lateral line abruptly curving to midlengthwise

axis of body behind pectoral and extending to base of caudal. Spinous dorsal as high as soft dorsal rays, last spine short. Dorsal deeply notched. Membrane of last dorsal ray attached to base of caudal. Pectoral shorter than head. Colour: Dull brown. Vertical fins brown; pectoral and upper edge of caudal lighter.

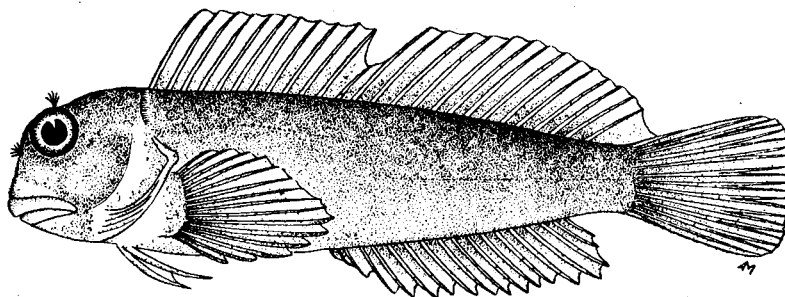


FIG. 442. *Cirripectus variolosus* (Valenciennes), 55 mm. (after Jones and Kumaran)

Local name: *Funna* (Minicoy).

Distribution: East coast of Africa, Seychelles, Laccadives, Indonesia to the Philippines, Samoan, Society, Solomon, Hawaiian and Marshall Islands and Australia.

443. *Cirripectus sebae* (Valenciennes)

Salarias sebae Cuvier and Valenciennes, Hist. Nat. Poissons, **11**, p. 323, 1836.

Cirripectus sebae de Beaufort and Chapman, Fishes of the Indo-Australian Archipelago, **9**, p. 251, 1951. Schultz and Chapman, Bull. 202, U.S. Nat. Mus., **2**, p. 313, pl. 114, A and B, 1960. Jones and Kumaran, J. Mar biol. Ass. India, **10**, p. 327, fig. 8, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/523).

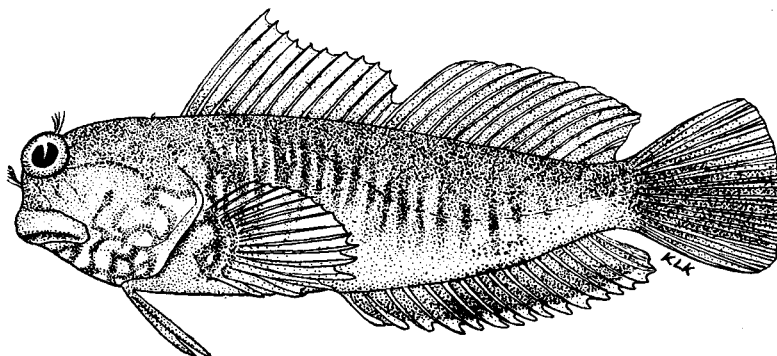


FIG. 443. *Cirripectus sebae* (Valenciennes), 59 mm. (after Jones and Kumaran)

Specimens studied: Ameni (4), 44 to 50 mm. Kavarathi (21), 28 to 58 mm. Minicoy (32), 25 to 59 mm.

D. XII, 14-15; A. II, 15-16; P. 15; V. I, 4.

Head 3.2-3.5 in standard length, 3.9-4.3 in total length. Depth of body equal to length of head. Eye 3.6-4.2 in head, about twice length of snout and about 0.4 in interorbital space. Upper lip and posterior corner of lower lip weakly crenulate. Numerous movable teeth in a single series in jaws, a strong canine posteriorly in lower jaw. Nasal cirrus with 4-7 simple filaments; supraorbital cirrus with 4-5 slender filaments. 32-40 simple filaments across nape. Lateral line abruptly curving behind pectoral, then extending to base of caudal along midlengthwise axis of body. Spinous dorsal higher than soft dorsal; first dorsal spine generally longer than second. Anal spines swollen; anal rays much shorter than dorsal rays. Last ray of dorsal attached to upper caudal ray by membrane. Colour: Brown with 8-14 dark brown vertical bars on sides of body. Sides of head, throat and breast with numerous pale spots or with reticulated brown lines. Fins brown, upper part of spinous dorsal and caudal fin pale or clear. Young specimens with a broad dark stripe from behind eye to caudal base.

Local name: *Funna* (Minicoy).

Distribution: Laccadives, Indonesia to Japan, Marshall, Phoenix, Samoan, Solomon, Fiji and Marianas Islands and Bismarck Archipelago.

444. *Cirripectus quagga* (Fowler and Ball)

Rupiscartes quagga Fowler and Ball, Proc. Acad. Nat. Sci. Philadelphia, 76, p. 273, 1924.
Cirripectes quagga Schultz and Chapman, Bull. 202, U.S. Nat. Mus., 2, p. 314, pl. 116, A-C, 1960. Jones and Kumaran, J. Mar. biol. Ass. India, 10, p. 328, fig. 9, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/524).

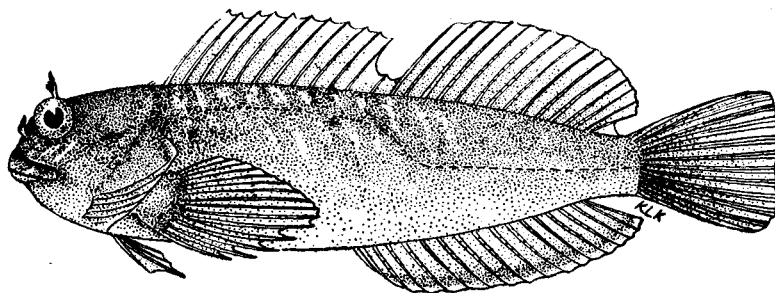


FIG. 444. *Cirripectus quagga* (Fowler and Ball), 45 mm. (after Jones and Kumaran)

Specimens studied: Kavarathi (23), 43 to 55 mm. Minicoy (12), 45 to 56 mm.

D. XII, 14-15; A. II, 15-16; P. 15; V. I, 4.

Head 3.3-3.6 in standard length, 4.0-4.4 in total length. Depth of body 3.8-4.1 in standard length, 4.6-5.0 in total length. Eye 3.8-4.2 in head, 0.4 in interorbital space and 0.6-0.8 in snout. Nasal cirrus with 3-4 simple filaments. Supraorbital cirrus arising from a fleshy base, with 3-4 filaments. 28-32 simple filaments in a row across nape. Upper lip deeply crenulate; lower lip weakly crenulate. A single series of numerous fine movable teeth in jaws; a strong canine posteriorly on each side of lower jaw. Lateral line arched over pectoral and then along midlengthwise axis of body and ending just in front of caudal base. First dorsal spine longest, slightly shorter than head. Pectoral half length of snout shorter than head. Ventral shorter than postorbital length of head. Colour: Light brown, often with 10-14 brown bars on sides. In large specimens the brown bars either diffused or lacking. A narrow dark brown streak from below middle of eye to upper lip, one from hind lower edge of eye to upper lip and another behind on gill membrane. These streaks sometimes interrupted. Fins dusky, upper part of caudal and pectoral lighter.

Local name: *Funna* (Minicoy).

Distribution: Laccadives in the Indian Ocean and Wake Island to Marshall Islands in the Pacific.

445. *Cirripectus stigmaticus* Strasburg and Schultz

Cirripectus stigmaticus Strasburg and Schultz, J. Washington Acad. Sci., 43 (4), p. 132, fig. 2, 1953. Schultz and Chapman, Bull. 202, U.S. Nat. Mus., 2, p. 316, pl. 113, fig. C-E, 1960.

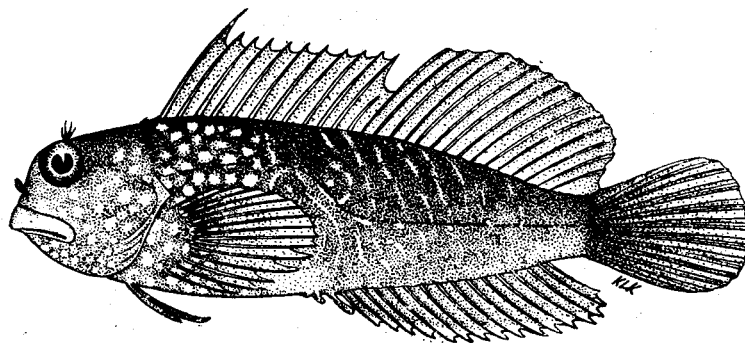


FIG. 445. *Cirripectus stigmaticus* Strasburg and Schultz, 59 mm.

Specimens studied: Minicoy (3), 49 to 59 mm.

D. XII, 15; A. II, 15-16; P. 15; V. I, 4.

Head 3.2-3.4 in standard length, 4.0-4.3 in total length. Depth of body 3.2-3.5 in standard length, 4.0-4.3 in total length. Eye 3.4-3.7 in head, 0.6-0.7 in snout and about 0.4 in interorbital space. Nasal cirrus with 4-5 simple filaments. Supraorbital cirrus with 5-7 filaments arising from a flattened base. 36-40 simple filaments in a row across nape, the band of filaments curving posteroventrally. Upper lip crenulate, lateral third on each side of lower lip somewhat plicate. Fine movable teeth in a single series in jaws; a canine tooth posteriorly in each side of lower jaw. Lateral line arched over pectoral fin, then curving to midlengthwise axis of body and ending at base of caudal. Pectoral slightly shorter than length of head. Ventral equal to postorbital length of head. Colour: Background colour brown, lower half of head and sides of body with round pale spots; these spots irregular behind tip of pectoral. In males, posterior half of sides of body with several narrow white irregular transverse markings. Median fins brown, but upper part of first two dorsal spines and upper lobe of caudal pale; a dusky stripe along base of dorsal; ventral dusky; pectoral pale dorsally, dusky ventrally.

Distribution: Marshall Islands in the Pacific and Laccadives in the Indian Ocean. This is the first record from the Indian Ocean.

446. *Entomacrodus striatus* (Quoy and Gaimard)

Salarias striatus Quoy and Gaimard (in Cuvier and Valenciennes), Hist. Nat. Poissons, 11, 309, 1836.

Entomacrodus striatus Chapman (in Weber and de Beaufort), Fishes of the Indo-Australian Archipelago, 9, p. 283, 1951. Munro, Fishes of Ceylon, p. 203, pl. 40, fig. 601, 1955. Smith, Ichth. Bull., 14, p. 241, pl. 14 C, 1959. Jones and Kumararaj, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/376).

Salarias frenatus Day, Fishes of India, p. 335, pl. 70, fig. 9, 1878.

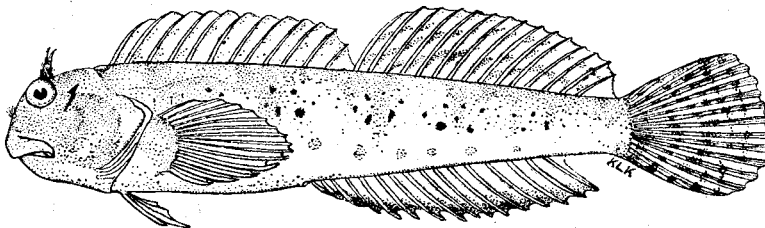


FIG. 446. *Entomacrodus striatus* (Quoy and Gaimard), 56 mm.

Specimens studied: Bitra (3), 45 to 50 mm. Chetlat (15), 48 to 83 mm. Kiltan (3), 40 to 67 mm. Minicoy (10), 45 to 73 mm.

D. XIII, 15-16; A. II, 15-16; P. 14; V. I, 4.

Head 3.9-4.3 in standard length, 4.8-5.3 in total length. Depth of body 4.7-5.3 in standard length, 5.8-6.4 in total length. Eye 4.0-4.4 in head and twice interorbital space. Nasal cirrus with 5-6 cilia. Supraorbital cirrus about $\frac{2}{3}$ eye diameter with 5-6 filaments on inner side. Nuchal cirrus simple and short. Upper lip crenulate, lower smooth. Dentary with a strong recurved canine posteriorly and fine teeth on vomer. Last dorsal spine minute, buried at bottom of dorsal notch. Last dorsal ray attached to caudal peduncle by membrane. Last anal ray free from caudal paduncle. Pectoral equal to or a little shorter than head. Colour: Pale yellowish with 5-6 pale vertical stripes on body and dark spots of varying intensities. Dorsal with dark spots appearing as oblique lines. Anal whitish, lower margin a little darker. Pectoral whitish, Caudal with 4-5 dark bands formed by spots on rays.

Local names: *Digu-funna*, *Kattu* (Minicoy). *Kakkadan*, *Mandian* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia to the Philippines and New Hebrides, Samoan and Society Islands.

447. *Entomacrodus vermiculatus* (Valenciennes)

Salarias vermiculatus Cuvier and Valenciennes, Hist. Nat. Poissons, **11**, p. 301, 1836. Day, Fishes of India, p. 335, 1878.

Entomacrodus vermiculatus Chapman (in Weber and de Beaufort), Fishes of the Indo-Australian Archipelago, **9**, p. 285, fig. 47, 1951. Smith, Ichth. Bull., **14**, p. 240, pl. 18, L and M, 1959. Jones and Kumaran, Indian J. Fish., **6**, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/377).

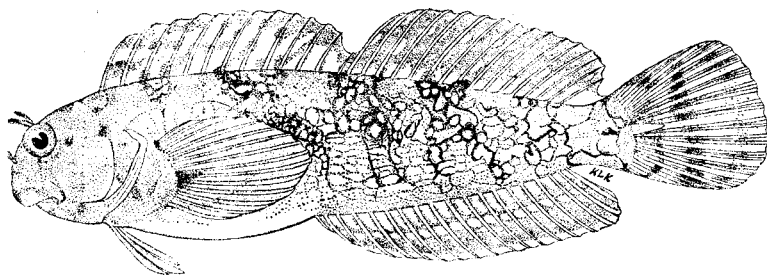


FIG. 447. *Entomacrodus vermiculatus* (Valenciennes), 83 mm.

Specimens studied: Agathi (12), 58 to 75 mm. Chetlat (3), 40 to 45 mm. Kadamat (2), 64 and 83 mm. Kavarathi (2), 120 and 130 mm. Minicoy (12), 42 to 100 mm.

D. XIII, 15-16; A. II, 18 (19); P. 14; V. I, 4.

Head 4.0-4.3 in standard length, 4.8-5.4 in total length. Depth of body 3.7-4.3 in standard length, 4.6-5.3 in total length. Eye 4.2-5.0 in head, 0.7-0.8

in snout and about 0.4-0.5 in interorbital space. Upper lip fully crenulate. Nasal cirrus with 4-7 filaments, supraorbital cirrus longer than eye diameter with several cilia on either side. Nuchal cirrus simple and pointed. Last dorsal spine small. Soft dorsal higher than spinous dorsal. Pectoral a little shorter than head. Ventral equal to postorbital part of head. Colour: Light yellowish to brown with dark brown reticulations on body. Small specimens lighter in general colouration with 5-6 somewhat obscure dark bands on sides. Head with brown spots. Dorsal brownish with dark stripes and light spots. Anal light basally, yellowish brown distally, sometimes mottled with white in large specimens, tips of rays lighter. Caudal with brownish spots on rays.

Local names: *Digu-funna*, *Kattu* (Minicoy). *Kakkadan*, *Mandian* (other islands).

Distribution: East coast of Africa and neighbouring islands, Laccadives, coasts of India, Andamans, Burma and Indonesia.

448. *Salarias fasciatus* (Bloch)

Blennius fasciatus Bloch. Naturges. Ausl nd. Fische, 2, p. 110. pl. 162, fig. 1, 1786.

Salarias fasciatus Day, Fishes of India, p. 330, 1878. Chapman (in Weber and de Beaufort), Fishes of the Indo-Australian Archipelago, 9, p. 315, 1951. Munro, Fishes of Ceylon, p. 204, pl. 40, fig. 604, 1955. Smith, Ichth. Bull., 14, p. 241, pl. 15, 1, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/378).

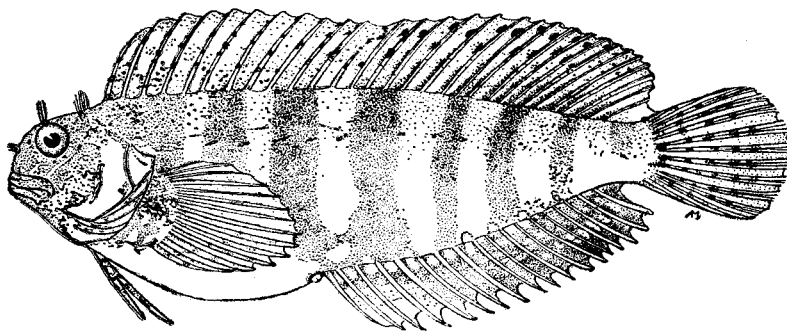


FIG. 448. *Salarias fasciatus* (Bloch), 70 mm.

Specimens studied: Agathi (4), 35 to 69 mm. Ameni (1), 75 mm. Bitra (2), 75 and 92 mm. Chetlat (2), 80 and 86 mm. Kadamat (1), 45 mm. Kalpeni (1), 87 mm. Minicoy (9), 38 to 75 mm.

D. XII, 18-19; A. II, 18-20; P. 14; V. I, 2.

Head 4.1-4.4 in standard length, 5.0-5.4 in total length. Depth of body 3.3-3.8 in standard length, 4.2-4.9 in total length. Eye 3.6-3.9 in head, 0.6-0.7

in snout and twice interorbital space. Nasal cirrus and supraorbital cirrus each with 3-4 cilia and nuchal cirrus with 8 or more cilia. Soft dorsal a little higher than spinous dorsal and last ray joined to caudal. Anal lower than spinous dorsal, front 3 or 4 rays greatly elongated in males. Pectoral equal to head. Ventral shorter than head without snout. Colour: Brown with 7-8 reticulated dark cross bars, oval light blotches on sides, dark spots on shoulder and along front of back, dorsal, caudal and pectoral. Anal dusky with dark and indistinct light spots posteriorly. Ventral with three dark bars.

Local names: *Digu-funna*, *Gali-kattu* (Minicoy). *Variyan-kakkadan*, *Mandian* (other islands).

Distribution: East coast of Africa, Red Sea, Persian Gulf, Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, China and Ryukyu, Marshall, Mariana, New Caledonia, New Hebrides, Fiji and Tuamotu Islands and Australia.

449. *Istiblennius lineatus* (Valenciennes)

Salarias lineatus Cuvier and Valenciennes, Hist. Nat. Poissons, 11, p. 314, 1836. Day, Fishes of India, p. 332, pl. 70, fig. 8, 1878. Chapman (in Weber and de Beaufort), Fishes of the Indo-Australian Archipelago, 9, p. 309, 1951.

Halmablennius lineatus Smith, Ichth. Bull., 14, p. 244, text figs. 8 and 9, 1959.

Istiblennius lineatus Munro, Fishes of Ceylon, p. 205, pl. 40, fig. 610, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/379).

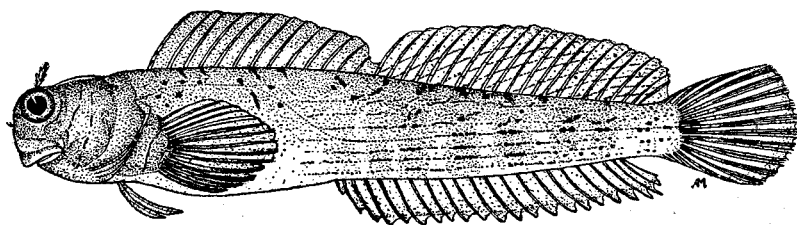


FIG. 449. *Istiblennius lineatus* (Valenciennes), 64 mm.

Specimens studied: Agathi (14), 66 to 74 mm. Chetlat (13), 50 to 73 mm. Kalpeni (16), 35 to 86 mm. Kavarathi (21), 50 to 66 mm. Kiltan (14), 46 to 85 mm. Minicoy (28), 43 to 115 mm.

D. XIII, 21-23; A. II, 23; P. 14; V. I, 3.

Head 4.8-5.3 in standard length, 5.5-6.3 in total length. Depth of body 4.9-5.8 in standard length, 5.7-6.5 in total length. Eye 3.7-4.3 in head and about twice interorbital space. Upper lip crenulate, lower lip smooth. No canine teeth. Nasal cirrus short with 4-5 filaments. Supraorbital cirrus broad, with 4 or 5 short filaments on either side. Nuchal tentacle absent. Crest well develop-

ed in males. First dorsal and second dorsal of almost equal height. Last ray of dorsal joined to the caudal by membrane. Pectoral equal to head without snout. Colour: Brownish, lighter below with 6 prominent narrow black bands along the sides, breaking up into streaks and spots on caudal peduncle. The upper 1-3 lines irregular and running oblique towards 6 pairs of blackish spots on the dorsal edge of body. 6-7 vertical dark bars sometimes present on sides of body. Head with wavy streaks and spots. Second dorsal pale with oblique brownish stripes. Anal pale with marginal brownish band. Dorsal lighter in colour in females than in males and with a narrow light submarginal dusky band on anal.

Local names: *Digu-funna*, *Kattu* (Minicoy). *Kakkadan*, *Mandian* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon and Mariana, Marshall and Tuamotu Islands, Bismarck Archipelago and Northern Queensland.

450. *Istiblennius edentulus* (Bloch and Schneider)

Blennius edentulus Bloch and Schneider, Syst. Ichth., p. 172, 1801.

Istiblennius edentulus Munro, Fishes of Ceylon, p. 205, pl. 40, fig. 608, 1955. Smith, Ichth. Bull., 14, p. 243, pl. 14, G, and text fig. 6, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/380).

Istiblennius enosimae Munro, Fishes of Ceylon, p. 206, pl. 40, fig. 611, 1955.

Salarias edentulus Chapman (in Weber and de Beaufort), Fishes of the Indo-Australian Archipelago, 9, p. 328, 1951. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959.

Salarias quadricornis Day, Fishes of India, p. 331, pl. 70, fig. 4, 1878.

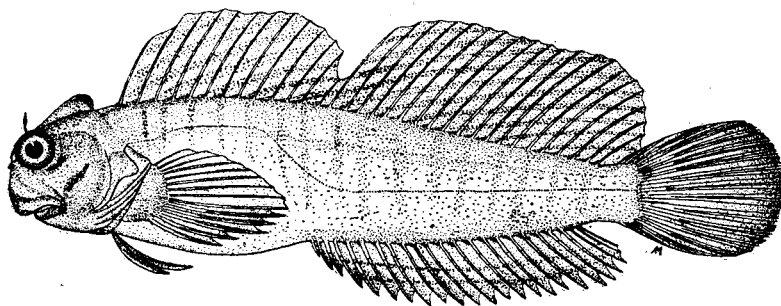


FIG. 450. *Istiblennius edentulus* (Bloch and Schneider), 85 mm.

Specimens studied: Agathi (25), 42 to 93 mm. Ameni (11), 66 to 91 mm. Bitra (44), 40 to 91 mm. Chetlat (50), 52 to 92 mm. Kalpeni (25), 25 to 93 mm. Kavarathi (26), 54 to 107 mm. Kiltan (28), 42 to 100 mm. Minicoy (29), 48 to 90 mm.

D. (XII) XIII, 19-21; A. II, 20-22; P. 14 (15); V. I, 3.

Head 4.2-4.7 in standard length, 5.1-5.8 in total length. Depth of body equal to or slightly more than length of head. Eye 3.6-4.3 in head and 0.5 in interorbital space. Nasal cirrus of 3-5 filaments. Supraorbital tentacle single, more than half eye diameter in length. Nuchal cirrus on each side single. Crest well developed in males, absent in females. First dorsal lower than second, last ray of second dorsal attached to dorsal edge of caudal fin. Anal lower than second dorsal, last ray not joined to caudal peduncle. Four or five anterior rays of anal in large males often swollen and crenulated. Longest pectoral ray slightly shorter than head. Ventral equal to postorbital length of head. Colour: Variable; generally brown to pale below, with 6-7 darker double transverse bars. Females generally with dark brown spots on posterior part of body and caudal peduncle and small brownish spots on dorsal and anal. A dark line from behind eye to corner of mouth. Caudal, pectoral and pelvic pale. Males without spots on body and fins. Males darker than females and with narrow oblique lines on dorsal and 2 or 3 light longitudinal lines on anal. Crest blackish.

Local names: *Digu-funna*, *Kattu* (Minicoy). *Kakkadan* (other islands).

Distribution: East coast of Africa, Red Sea, Arabia to the Laccadives, coasts of India and Ceylon, Indonesia, Philippines, Queensland and Samoan, Phoenix, Tahiti, Tuamotu and Hawaiian Islands.

451. *Istiblennius periophthalmus* (Valenciennes)

Salarias periophthalmus Cuvier and Valenciennes, Hist. Nat. Poissons, 11, p. 311, 1836. Day, Fishes of India, p. 333, pl. 69, fig. 5, 1878. Chapman (in Weber and de Beaufort), Fishes of the Indo-Australian Archipelago, 9, p. 300, 1951.

Istiblennius periophthalmus Smith, Ichth. Bull., 14, p. 243, pl. 14, B, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 118/381).

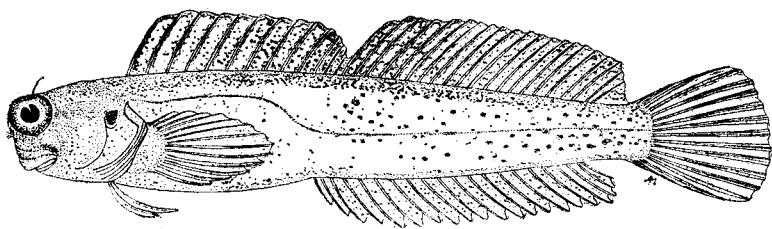


FIG. 451. *Istiblennius periophthalmus* (Valenciennes), 58 mm.

Specimens studied: Agathi (27), 50 to 115 mm. Ameni (33), 42 to 85 mm. Bitra (25), 30 to 105 mm. Chetlat (15), 30 to 103 mm. Kadamat (34), 33 to 89 mm. Kalpeni (21), 42 to 79 mm. Kavarathi (25), 56 to 112 mm. Kiltan (25), 45 to 110 mm. Minicoy (39), 47 to 100 mm. Suheli (16), 40 to 96 mm.

D. XIII, 20-21; A. II, 20-22; P. (13) 14; V. I, 3.

Head 4.3-4.8 in standard length, 5.2-6.0 in total length. Depth of body 4.4-5.1 in standard length, 5.4-6.3 in total length. Eye 3.4-4.3 in head and twice interorbital space. Nasal cirrus with 4-5 filaments. Supraorbital cirrus simple and pointed, nuchal cirrus simple and short. Upper lip crenulate, lower lip smooth. A short canine posteriorly in lower jaw. Last dorsal spine short, buried in membrane of notch. Last dorsal ray connected to caudal peduncle by membrane. Last anal ray free from caudal peduncle. Longest pectoral ray a little shorter than head without snout. Colour: Male: Dusky or lighter with indistinct vertical bands on sides and indistinct light dots on head with two rows of large spots along sides. A black spot edged white at upper corner of opercle and a pale streak behind eye. Spinous dorsal with large brownish spots, margin of fin clear, soft dorsal clear with narrow brownish oblique lines. Anal pale, somewhat dark submarginally. Caudal clear, ventral border dusky. Female: Female with indistinct light dots on head and anterior part of body. Pale vertical bands on body often present. Small black dots over posterior part of body. Dorsal and anal mostly clear, spines with indistinct brownish patches, margin of fins somewhat dusky. Dark blotch over operculum bordered with white.

Local names: *Digu-funna*, *Kattu* (Minicoy). *Kakkadan*, *Mandian* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Indonesia, Philippines and Samoan, Tahiti, Phoenix and Marquesas Islands.

Family TRIPTERYGIONTIDAE

Body moderately elongate. Three dorsal fins, the first and the second consisting of spines. Ventrals jugular, with or without a spine and 2 rays. Gill opening wide. Teeth conical or villiform, in several rows in jaws and in a narrow patch on vomer. Body generally scaly with a distinct incomplete lateral line.

1. Second dorsal with XII spines. Llat. about 30. Nape scaled. A small orbital tentacle. First spine of first dorsal more than $\frac{2}{3}$ of that of second dorsal *Tripterygion fasciatum*
 Second dorsal with XIII-XIV spines. Llat. 42-49. Nape naked. No orbital tentacle 2
2. First spine of first dorsal equal to half that of second dorsal. Llat. 47-49. Space below second dorsal scaly *Tripterygion trigloides*
 First spine of first dorsal $\frac{2}{3}$ of that of second dorsal. Llat. 42-44. Space below anterior part of second dorsal naked .. *Tripterygion gymnauchen*

452. *Tripterygion fasciatum* Weber

Tripterygion fasciatum Weber, *Siboga* Exped., Fische, 57, p. 548, fig. 118, 1913. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 396, fig. 59, 1951. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 194/383).
Tripterygion (Enneapterygius) fasciatum Mukerji, Rec. Indian Mus., 37, p. 272, 1935.

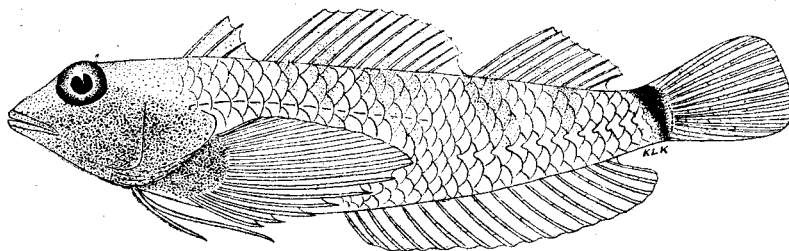


FIG. 452. *Tripterygion fasciatum* Weber, 28 mm.

Specimens studied: Kavarathi (34), 19 to 28 mm. Kiltan (2), 21 and 28 mm.

D₁. III; D₂. XII; D₃. 8-9; A. 18; P. 16; V. 2. Llat. 30-31.

Head 3.2-3.3 in standard length, 3.8-4.0 in total length. Depth of body 4.2-4.5 in standard length, 5.1-5.5 in total length. Eye 3.3-3.5 in head, 0.8-0.9 in snout and about 0.3 in interorbital space. Mouth slightly oblique, maxillary reaching to below front border of pupil. A nasal tentacle and a small orbital tentacle present. Teeth minute in jaws and in an angular band on vomer. First spine of first dorsal slightly more than 2/3 of first spine of second dorsal. Pectoral slightly longer than head. Inner ray of ventral longer, as long as head without snout. 7 lower rays of pectoral thickened and undivided. Nape scaled; head, base of pectoral and belly naked. Lateral line with 15 scales, convexly curved and ending below last spine of second dorsal. Colour: Preserved specimens yellowish; lower parts of head and base of pectoral dark brown, a dark vertical band at base of caudal. First and second dorsal with dark markings, the third dorsal with three or four oblique bands. Caudal fin rays with 5-6 rows of dark spots.

Distribution: Laccadives, Andamans and Indonesia.

453. *Tripterygion trigloides* Bleeker

Tripterygion trigloides Bleeker, Nat. Tijds. Ned.-Ind., 15, p. 234, 1858. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, 393, 1951. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 194/382).
Tripterygium trigloides Day, Fishes of India, p. 336, 1878.

Specimens studied: Kiltan (6), 22 to 24 mm. Minicoy (5), 21 to 27 mm.

D₁. III; D₂. XIII (XIV); D₃. 10; A. 19-20; P. 15-16; V. 2. Llat. 47-49.

Head 3.2-3.4 in standard length, 3.9-4.2 in total length. Depth of body 4.6-4.9 in standard length, 5.5-5.9 in total length. Eye 3.1-3.3 in head, 0.7 in snout and 0.3 in interorbital space. Mouth slightly oblique, maxilla reaching to below front border of pupil or slightly beyond. Anterior nostril tubular with a bilobed tentacle; posterior nostril with raised rim. Conical teeth in rows in jaws and an angular patch of minute teeth on vomer. Gill membranes united, free from isthmus. First spine of first dorsal equal to half length of first spine of second dorsal. Pectoral equal to or slightly longer than head; 6-7 lower rays undivided and thickened. Inner ray of ventral longer, as long as head without snout. Head, nape, anterior part of back upto anterior spines of second dorsal, base of pectoral and belly naked. Lateral line with 21-23 pored scales; anterior part concavely curved and ending below second ray of third dorsal. Colour: Pink, becoming pale yellowish on preservation with four dusky brown cross bars on sides; lower parts of head below lower border of eye with black dots extending on to base of lower part of pectoral. Dorsal fins clear, sometimes with dusky border to spinous dorsals. Anal pale to dusky. Dark dots sometimes present on lower rays of pectoral.

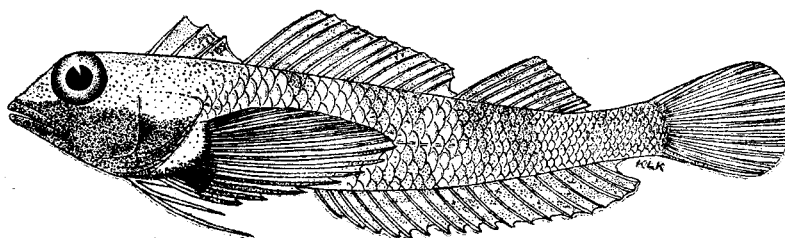


FIG. 453. *Tripterygion trigloides* Bleeker, 27 mm.

Distribution: Laccadives, Waltair on the east coast of India, Indonesia and Philippines.

454. *Tripterygion gymnauchen* Weber

Tripterygium Gymnauchen Weber, Notes Leiden Mus., 31, p. 149, 1909. *Siboga* Exped., Fische, p. 548, fig. 119, 1913.

Tripterygion gymnauchen de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 394, 1951. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 192, fig. 2 C, 1970.

Specimens studied: Kavarathi (9), 20 to 35 mm.

D₁. III; D₂. XIV; D₃. 9-10; A. 20-21; P. 16. Llat. 42-44.

Head 3.2-3.4 in standard length, 3.7-3.8 in total length. Depth of body 4.8-5.2 in standard length, 5.6-6.1 in total length. Eye 3.0-3.2 in head, about 0.8 in snout and 0.3 in interorbital space. Head, narrow portion below first

dorsal and of anterior part of second dorsal and breast naked. Lateral line with 24-26 scales, ending below second ray of third dorsal. First spine of first dorsal equal to about two thirds of length of first spine of second dorsal. Pectoral equal to or slightly shorter than head. Inner ray of ventral longest, equal to post-orbital part of head with half eye diameter. Colour: pale to brownish, sides of body sometimes with irregular dark bars. Lower part of head and pectoral base with dark brown pigments. Dorsal fins, caudal and anal dusky in some specimens. Lower rays of pectoral dusky, upper rays brownish.

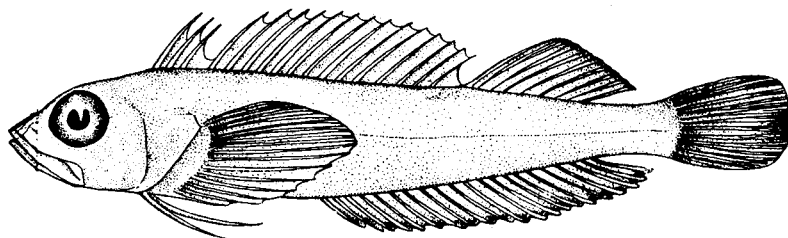


FIG. 454. *Tripterygion gymnauchen* Weber, 34 mm. (after Jones and Kumaran)

Distribution: Known only from Timor in Indonesia and Laccadives in the Central Indian Ocean.

Suborder OPHIDIOIDEI

Body compressed, extremely elongate, naked or with small cycloid scales. Ventrals when present, mental or jugular with 1-2 rays. Parasphenoid united with frontals. Lateral line incomplete or absent. A single dorsal fin consisting of rays. Gill openings often wide.

Vent behind head; origin of anal fin behind origin of dorsal fin; ventrals jugular BROTULIDAE

Vent near throat; origin of anal fin in advance of origin of dorsal fin; ventrals absent CARAPIDAE

Family BROTULIDAE

Body compressed, elongate and tapering posteriorly. Maxillary often enlarged behind. Dorsal origin above or slightly behind hind border of operculum. Ventral small, in advance of base of pectoral. Gill membranes often free from isthmus. Scales generally present, minute and cycloid.

1. Caudal fin distinct. Ventral filament single. A flat opercular spine. D. 90-92; A. 67-68; P. 22 *Dinematichthys ilucoeteoides*
- Caudal fin confluent with dorsal and anal 2

2. Ventrals inserted on humeral symphysis. Lateral line continuous, distinct. Head 4.2, depth 4.7, both in standard length . . *Monomitopus nigripinnis*
Ventrals inserted on isthmus, close to humeral symphysis 3
3. Ventrals a pair of bifid rays. Operculum with one spine. Head 5.3, depth about 5.6, both in standard length *Neobythites pterotus*
Ventrals a pair of simple rays 4
4. Lower pectoral rays free. D. 100-106; A. 78-85; P. 17-19+6-9
. *Dicrolene intronigra*
No free pectoral rays. D.160+; A.140+; P. 16 *Dermatorus trichiurus*

455. *Dinematichthys ilucoeteoides* Bleeker

Dinematichthys ilucoeteoides Bleeker, Nat. Tijds. Ned.-Ind., 8, p. 319, 1855. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 438, fig. 79, 1951. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 174, fig. 13, 1966.

? *Dermatopsoides kasougae* Smith, Fishes of Southern Africa, p. 361, pl. 82, fig. 1011, 1949.

Dinematichthys ilucoeteoides Smith and Smith, Fishes of Seychelles, p. 52, pl. 33 J, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 24, 1969 (Cat. No. CMFRI-LA-F. 121/386).

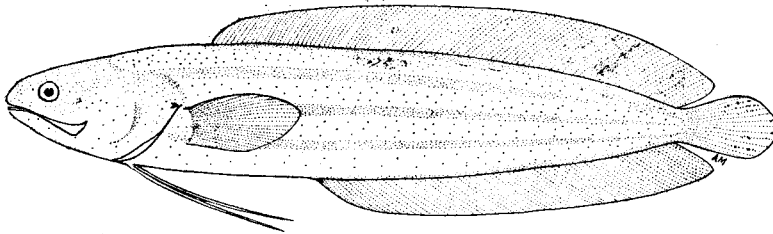


FIG. 455. *Dinematichthys ilucoeteoides* Bleeker, 53 mm. (after Jones and Kumaran)

Specimens studied: Agathi (1), 53 mm. Kavarathi (3), 44 to 78 mm.

D. 90-92; A. 67-68; P. 22.

Head 3.8-4.2 in standard length, 4.3-4.7 in total length. Depth of body 4.6-4.9 in standard length, 5.2-5.6 in total length. Eye about 7.8-8.0 in head, 1.8-2.0 in snout and about 1.7-2.0 in interorbital space. Pectoral equal to post-orbital length of head. Ventral with a single ray, shorter than head by half length of snout. Upper jaw twice in head. Body posteriorly compressed. Dorsal origin about 2 eye diameter behind head. Dorsal and anal fins extending to base of caudal fin. Scales minute, cycloid. Snout and chin finely papillate. Minute teeth in rows in jaws and in narrow band on vomer and palatines. Colour: Plain orange.

Distribution: East coast of South Africa, Mauritius, Seychelles, Laccadives, Indonesia, Malaysia, Philippines and Marshall, Caroline, Samoan and Society Islands.

456. *Monomitopus nigripinnis* (Alcock)

Sirembo nigripinnis Alcock, Ann. Mag. Nat. Hist., (6) 4, p. 384, 1889.

Monomitopus nigripinne Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 297, 1890.

Monomitopus nigripinnis Alcock, Ann. Mag. Nat. Hist., (6) 8, p. 29, 1891. Alcock, Illus. Zool. Investigator, pl. 11, fig. 3, 1894.

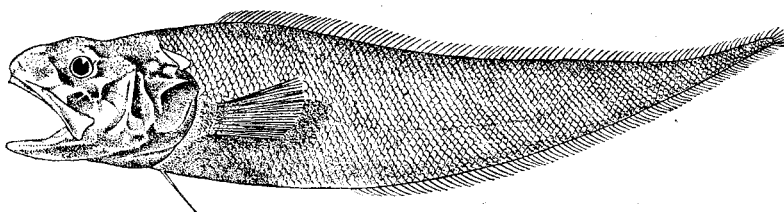


FIG. 456. *Monomitopus nigripinnis* (Alcock). (after Alcock)

D. 95-100; A. 85-88; P. 28; V. I.

Elongate, compressed, tapering to the tail. Head 4.2, depth of body 4.7, both in standard length. Eye small, its diameter much less than length of somewhat rounded snout. Mouth wide; maxilla reaching slightly beyond hind border of eye. Teeth in villiform bands in jaws, vomer and palatines. Operculum with one strong spine above. Gill membranes free from isthmus. Gill rakers long. Dorsal and anal fins more or less confluent with caudal. Origin of dorsal in vertical through base of pectoral. Origin of ventral about one head length behind head. Ventral inserted just behind symphysis of cleithra. Ventral shorter than snout and eye together. Scales small, deciduous. Colour: Brown; chest and abdomen darker.

Distribution: Andaman Sea, Bay of Bengal and Laccadive Sea.

457. *Neobythites pterotus* Alcock

Neobythites pterotus Alcock, Ann. Mag. Nat. Hist., p. 210, 1890. Alcock, Ibid., (6) 6, p. 297, 1890. Alcock, Ibid., (6) 8, p. 30, 1891. Alcock, Illus. Zool. Investigator, pl. 29, fig. 1, 1895.

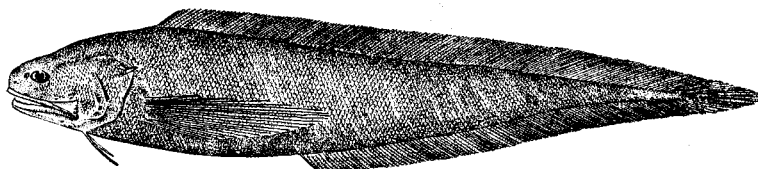


FIG. 457. *Neobythites pterotus* Alcock. (after Alcock)

Body elongate, compressed, tapering to the tail. Head 5.3 in standard length, about 6.0 in total length. Depth of body 5.6 in standard length, 6.2 in total length. Eye about 6.5 in head and 1.2 in snout. Mouth wide; maxillary reaching far beyond eye. Gill membranes free from isthmus. Operculum with a strong spine. Teeth in villiform bands in jaws, vomer and palatines. Origin of dorsal behind a level from hind border of operculum. Anal origin about 1.3 head length behind head. Dorsal and anal confluent with caudal. Pectoral long, about 1.5 times head length. Ventral adnate basally, shorter than half length of head. Scales small, cycloid. Colour: Brown; lower part of head, chest and abdomen blackish. Fins dark brown.

Distribution: Laccadive Sea and Bay of Bengal.

458. *Dicrolene intronigra* Goode and Bean

Dicrolene intronigra Goode and Bean, Bull. Mus. Comp. Zool., 10, p. 202, 1883. Vaillant, Exp. Sci. Travailleuse et Talisman, p. 258, pl. 23, fig. 2, 1888. Goode and Bean, Oceanic Ichthyology, p. 338, pl. 85, fig. 297, 1895. Alcock, Cat. Indian Deep Sea Fish., p. 85, 1899.

Dicrolene introniger Smith, Fishes of Southern Africa, p. 362, fig. 1015, 1949.

Paradicrolene Vaillanti Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 297, 1890.

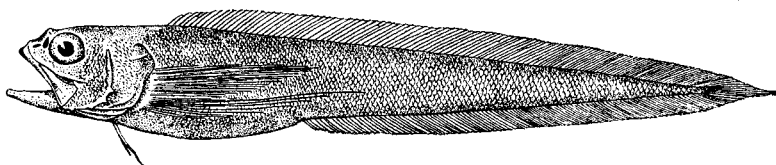


FIG. 458. *Dicrolene intronigra* Goode and Bean. (after Goode and Bean)

D. 100-106; A. 78-85; P. 17-19+6-9; V. 2. Llat. 110-125.

Head somewhat compressed, upper surface flattish. Body moderately compressed, tail tapering. Head about 5.5, depth of body 6-8, both in standard length. Mouth large; maxillary reaching behind vertical from hind border of eye. Teeth in villiform bands in jaws. Opercle with a sharp spine. Preopercle rounded with three or four small spines. Gill openings wide. 8 branchiostegals. Dorsal insertion behind base of pectoral. Anal insertion about a head length behind head. Dorsal and anal fins confluent with caudal; caudal peduncle absent. 6-9 lower pectoral rays free and produced, longest free ray about 1.7 times head. Ventral rays bifid, its origin at isthmus and its length much shorter than half length of head. Scales small; 7 scales between base of dorsal and lateral line and about 27 scales below lateral line. Colour: Grey to dusky with pink reflections; mouth and gill openings blackish.

Distribution: Bathypelagic in the warmer Atlantic; off Cape of Good Hope, South Arabian coast, Laccadive Sea and Andaman Sea in the Indian Ocean.

459. *Dermatorus trichiurus* Alcock

Dermatorus trichiurus Alcock, Ann. Mag. Nat. Hist., (6) 6, p. 298, 1890. Alcock, Illus. Zool. Investigator, pl. 1, fig. 1, 1892.

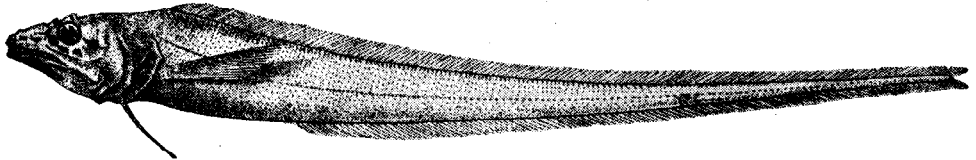


FIG. 459. *Dermatorus trichiurus* Alcock. (after Alcock)

D. 160 +; A. 140 +; P. 16 (?); V. I.

Body compressed, tail tapering. Snout depressed and somewhat acutely pointed. Head 6.5, depth of body about 11, both in total length. Eye situated high up, about 4.7 in head and 1.3 in snout. Mouth very wide, maxillary expanded behind and reaching far beyond eye. Villiform teeth in bands in jaws and a few teeth on vomer. Eight branchiostegals. Barbel absent. A strong spine at each orbital angle and two rows of recumbent spines diverging backwards. Operculum with a strong spine above; preoperculum with a double border, each with three distant spines. Gill rakers well developed, 20 in first arch. Scales small, deciduous. Lateral line indistinct. Dorsal origin almost above a vertical from hind border of operculum. Anal origin about a head length behind head. Pectoral equal to head without snout. Ventral simple, inserted close behind cleithra and equal to postorbital part of head. Colour: Grey; lower part of head and chest black.

Distribution: Laccadive Sea.

Family CARAPIDAE

Elongate, tail tapering posteriorly and subcylindrical or compressed. Dorsal and anal along most of length and confluent around tail. Scales absent. Ventrals absent. Gill openings wide. Gill membranes free from isthmus. Vent anterior, just in front of anal origin. Scales absent. Lateral line rudimentary. Mouth large. Teeth villiform or granular in one or more series in jaws and on palatines and sometimes on vomer.

1. Maxillary completely covered by skin. Teeth uniserial. Head and front of body a little compressed. Head and body except chest and abdomen with brown spots, hind part of tail darker *Jordanicus gracilis*
- Maxilla completely free. Teeth generally not uniserial 2

2. Three caninoid teeth on vomer. Pectoral longer than one third of head ... 3
Teeth on vomer not caninoid. Pectoral shorter than one third of head.
Head 9.2-9.5, depth 12.2-12.8, both in total length. Brownish with fine dark dots *Carapus parvipinnis*
3. Head 7.3-7.8, depth 10.2-11.6 in total length. Translucent in life; yellowish on preservation *Carapus homei*
Head 8.2, depth 12.5 in total length. Translucent in life; sides of head and body with brown spots, those behind eye larger ... *Carapus mourlani*

460. *Jordanicus gracilis* (Bleeker)

Oxybeles gracilis Bleeker, Nat. Tijds. Ned.-Ind., 11, p. 105. 1856.

Carapus gracilis de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 453, fig. 87, 1951.

Encheliophis (Jordanicus) gracilis Arnold, Bull. Brit. Mus., 4, (6), p. 299, fig. 20, 1956.

Jordanicus gracilis Smith, Fishes of Southern Africa, p. 360, 1949. Smith, Ann. Mag. Nat. Hist., (12) 8, p. 404, fig. 1, 1955. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 173, fig. 12, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 120/387).

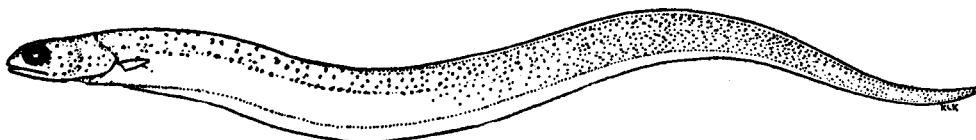


FIG. 460. *Jordanicus gracilis* (Bleeker), 215 mm. (after Jones and Kumaran)

Specimens studied: Chetlat (1), 215 mm. Collected from *Holothuria marmorata*.

Head 9.2, depth of body 16.8, both in total length. Eye 4.2 in head, 0.8 in snout and also in interorbital space. Width of head about half length of head. Maximum width of body 1.4 in depth. Mouth almost horizontal, maxilla not free and completely covered by skin, reaching slightly behind hind border of eye. Gill opening not extending above base of pectoral. Origin of vent slightly before a level from base of pectoral. Dorsal lower than anal, its origin $1\frac{1}{3}$ head length behind head. A single series of teeth in jaws; vomer with two large recurved canines with a small tooth on each side, palatines with a single row of teeth. Colour: Light yellowish; head and body except chest and abdomen with brown spots, hind part of tail darker.

Local name: *Kokkaya-meen* (Chetlat).

Distribution: East coast of Africa, Red Sea, Laccadives, Indonesia and Palau, Samoan, Fiji, Tonga, Solomon and Hawaiian Islands.

461. *Carapus parvipinnis* (Kaup)

Fierasfer parvipinnis Kaup, Cat. Apodal Fish. Brit. Mus., p. 160, pl. 16, fig. 2, 1856.

Carapus parvipinnis Smith, Ann. Mag. Nat. Hist., (12) 8, p. 412, 1955. Arnold, Bull. Brit. Mus., 4 (6), p. 279, fig. 12, 1956. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 120/389).

Specimens studied: Minicoy (2), 244 and 266 mm. Collected from *Holothuria marmorata*.



FIG. 461. *Carapus parvipinnis* (Kaup), 266 mm.

Head 9.2-9.5, depth of body 12.2-12.8, both in total length. Eye 5.5-6.4 in head and equal to or slightly more than snout. Maximum depth of head and also width of head about $\frac{3}{5}$ of head. Maxilla free, extending well behind hind border of eye. Small sharp teeth in bands in both jaws; vomer with 3-4 slightly large conical teeth surrounded by smaller teeth and conical teeth in bands on palatines. Dorsal fin very low, its origin $\frac{3}{4}$ head length behind head. 3 gill rakers on lower limb near angle elongate, 2 knobs on upper limb and 3-4 knobs on lower limb. Pectoral fin 3.5-3.8 in length of head. Vent slightly before a level from pectoral base. Colour: Brownish with fine dark dots.

Distribution: Mauritius, Laccadives, Philippines and Caroline, Samoan, Society and Solomon Islands.

462. *Carapus homei* (Richardson)

Oxybeles homei Richardson, Voy. Erebus and Terror, Fishes, p. 74, 1855.

Carapus homei Herre, Mem. Indian Mus., 13, p. 397, 1941. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 450, fig. 88, 1951. Smith, Ann. Mag. Nat. Hist., (12) 8, p. 414, 1955. Munro, Fishes of Ceylon, p. 207, pl. 51, fig. 613, 1955. Arnold, Bull. Brit. Mus., 4 (6), p. 273, fig. 11, 1956. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 120/388).

Fierasfer homei Day, Fishes of India, Supple., p. 805, 1888.

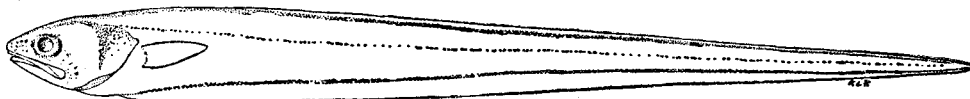


FIG. 462. *Carapus homei* (Richardson), 129 mm.

Specimens studied: Agathi (3), 75 to 78 mm. Chetlat (3), 126 to 129 mm. Minicoy (8), 103 to 140 mm. All specimens collected from *Holothuria marmorata*.

Head 7.3-7.8 in total length, depth of body 10.2-11.6 in total length. Eye 4.3-4.6 in head, 0.8 in snout and slightly more than interorbital space. Maxilla free, reaching about $\frac{1}{2}$ eye diameter behind eye. Width of head slightly more than half length of head. Width of body 1.6-1.8 in height. Vent in advance of a vertical through origin of pectoral. 3 elongate gill rakers on lower limb near angle, 2 knobs on upper limb and 3 knobs on lower limb. Fine teeth in one or two rows in upper jaw, a pair of teeth in front enlarged; teeth in lower jaw in 2-3 rows, outer row slightly larger. 3-4 large curved teeth on vomer with small teeth on either side. Palatines with a narrow band of conical teeth. Pectoral equal to half length of head or slightly longer. Dorsal fin narrower than anal, its origin about $\frac{3}{4}$ length of head behind head. Colour: Translucent in life, becoming yellowish after preservation.

Local names: *Billuri-mas* (Minicoy). *Kokkaya-meen* (Chetlat).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Chagos Archipelago, Indonesia, Philippines, Australia and Marshall, Samoan, Solomon, kingsmill, Society and Hawaiian Islands.

463. *Carapus mourlani* (Petit)

Fierasfer mourlani Petit, Bull. Mus. Hist. Nat. Paris, 2 (6), p. 393, 1934.

Carapus mourlani Schultz, Bull. 202, U.S. Nat. Mus., 2, p. 393, pl. 120, E, 1960. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 192, fig. 1 f, 1970.

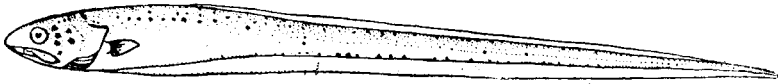


FIG. 463. *Carapus mourlani* (Petit), 75 mm. (after Jones and Kumaran)

Specimen studied: Bangaram (1), 75 mm. Collected from the body cavity of *Culcita novaguineae*.

Head 8.2, depth of body 12.5, both in total length. Eye about 5.5 in head, 3.5 in postorbital length of head and a little more than interorbital space. Postorbital length of head 1.6 in head. Maxilla free, movable, reaching behind a vertical through hind border of eye. Width of head about half length of head. Width of body about 1.6 in its height. Vent slightly in front of a vertical through origin of pectoral. Three gill rakers on lower limb of first gill arch near angle elongate, others short. Fine conical teeth in two series in upper jaw, a pair of short canines near symphysis. Teeth in lower jaw in two rows, outer row slightly larger. Three large curved teeth on vomer with smaller ones on either side. A narrow band of conical teeth on palatines. Pectoral fin about three in head.

Colour: Translucent in life, becoming pale on preservation. Sides of head, underside of lower jaw and sides of body with brown spots, those behind eye larger.

Distribution: Known only from Madagascar in the Western Indian Ocean, Laccadives in the Central Indian Ocean and Marshall Islands and Oahu (Hawaiian Islands) in the Pacific.

Suborder SIGANOIDEI

Family SIGANIDAE

Oblong, compressed and covered with minute, thin scales. Mouth small, terminal. A single series of compressed, bicuspid or slightly serrated teeth in jaws. Palatines edentulous. Dorsal of XIII heteracanth spines and 10 branched rays. A sharp forwardly directed spine at nape. Anal of VII spines and 9 branched rays. Ventrals with two spines and three branched rays between them. Lateral line complete.

1. Last dorsal spine slightly shorter than first spine. Caudal deeply forked, tips of lobes pointed. Small pale spots on head and body and a brownish streak along hind border of opercle *Siganus rostratus*
Last dorsal spine longer than first spine. Colour not as above 2
2. Caudal deeply forked. Less than 25 scales between median dorsal spines and lateral line. Head and body completely covered with large dark brown spots. A pale yellow predorsal patch. A large black spot usually present behind upper edge of gill opening *Siganus stellatus*
Caudal emarginate. More than 30 scales between median dorsal spines and lateral line. Sides with longitudinal bands, those on back broken up into spots *Siganus javus*

464. *Siganus rostratus* (Valenciennes)

Amphacanthus rostratus Cuvier and Valenciennes, Hist. Nat. Poissons, 10, p. 116, 1835.
Siganus rostratus de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 102, 1951.
Smith and Smith, Fishes of Seychelles, p. 45, pl. 35, C, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 305, fig. 25, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 123/390).

Specimens studied: Agathi (13), 58 to 129 mm. Ameni (1), 230 mm. Bitra (2), 68 and 176 mm. Chetlat (2), 151 and 172 mm. Kavarathi (4), 47 to 186 mm. Minicoy (11), 83 to 256 mm. Suheli (1), 199 mm.

D. XIII, 10; A. VII, 9; P. ii, 16; V. I, 3, I.

Head 4.0-4.3 in standard length, 5.0-5.4 in total length. Depth of body 2.4-2.7 in standard length, 3.1-3.5 in total length. In young specimens, head

longer and height more. Eye 3.4-3.7 in head, 1.3-1.5 in snout and 1.1-1.3 in interorbital space. Anterior nostril with a posterior flap. First dorsal spine equal to diameter of eye, 5th or 6th longest, equal to $1\frac{1}{2}$ diameter of eye, last dorsal spine shorter than the first one. First anal spine slightly more than diameter of eye; fourth spine longest, equal to longest dorsal spine; last anal spine equal to or slightly longer than last dorsal spine. Pectoral half length of snout shorter than head. Ventral slightly shorter. Caudal deeply forked, lobes pointed. Colour: Highly variable; usually brown, paler below with small pale spots in some specimens. A brownish streak along hind border of opercle. Indistinct wavy longitudinal lines in some medium sized specimens. Membrane of spinous dorsal and anal with dusky blotches or shades, soft dorsal and anal pale, rays with brownish streaks. Caudal brownish, lobes with 5-6 brown transverse bars. Two or three faint brown bands across ventrals.

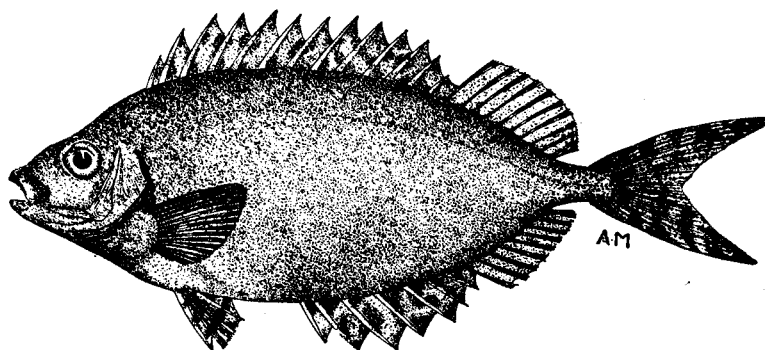


FIG. 464. *Siganus rostratus* (Valenciennes), 172 mm. (after Jones and Kumaran)

Local names: *Bori* (Minicoy). *Kalloran* (other islands).

Distribution: Mozambique, Zanzibar, Seychelles, Red Sea, Laccadives, Philippines and Marshall, Mariana, Caroline, Solomon, New Hebrides, Samoan, Gilbert and Society Islands.

465. *Siganus stellatus* (Forskål)

Scarus stellatus Forskål, Descript. Animal., p. 26, 1775.

Siganus stellatus Smith, Fishes of Southern Africa, p. 328, pl. 35, fig. 902 a, 1949. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 120, 1951. Munro, Fishes of Ceylon, p. 210, pl. 41, fig. 622, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 123/191).

Teuthis stellata Day, Fishes of India, p. 168, 1878.

Specimens studied: Agathi (12), 60 to 270 mm. Ameni (18), 48 to 115 mm. Bitra (5), 83 to 90 mm. Chetlat (23), 65 to 175 mm. Minicoy (41), 50 to 246 mm. Suheli (28), 70 to 210 mm.

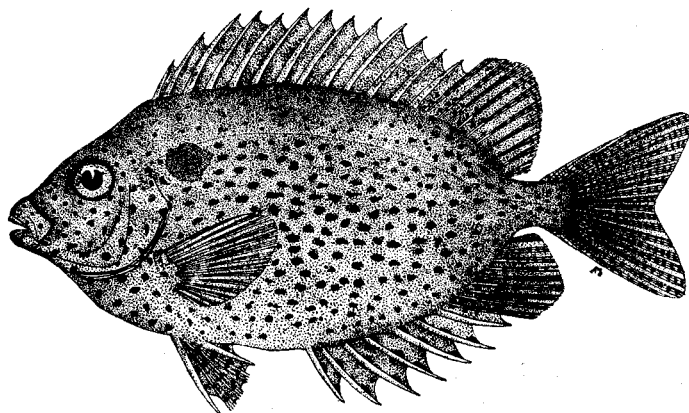


FIG. 465. *Siganus stellatus* (Forsk.), 96 mm.

D. XIII, 10; A. VII, 9; P. ii, 15;

(In one, presumably an abnormal specimen, D. XIV, 9. The XIVth dorsal spine short and equal in length to the 1st dorsal spine).

Head 3.1-3.4 in standard length, 3.9-4.4 in total length. Depth of body 2.1-2.3 in standard length, 2.6-2.9 in total length. Eye 3.2-3.6 in head, 1.3-1.6 in snout and 1.0-1.3 in interorbital space. First dorsal spine equal to diameter of eye; 3rd or 4th longest, about twice diameter of eye; last spine longer than first one. First anal spine slightly longer than 1st dorsal spine; 3rd or 4th longest, equal to or shorter than longest dorsal spine; last anal spine $1\frac{1}{2}$ diameter of eye. Pectoral half length of snout shorter than head, ventral slightly shorter. Colour: Brownish with dark brown spots all over head, body and tail. A large dark blotch at origin of lateral line tending to fade in large specimens. A pale yellow predorsal patch in fresh specimens changing to general body colour on preservation. Spinous dorsal, anal and ventral with brownish patches. Soft dorsal and anal light with brown spots. Pectoral pale yellowish.

Local names: *Vori* (Minicoy). *Oran*, *Kalloran* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Ryukyu, Caroline, Palau, Solomon, Fiji and Samoan Islands and North Australia.

466. *Siganus javus* (Linnaeus)

Teuthis javus Linnaeus, Syst. Nat., ed. 12, 1, p. 507, 1766.

Siganus javus de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 111, fig. 23, 1951. Munro, Fishes of Ceylon, p. 209, pl. 41, fig. 620, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 123/525).

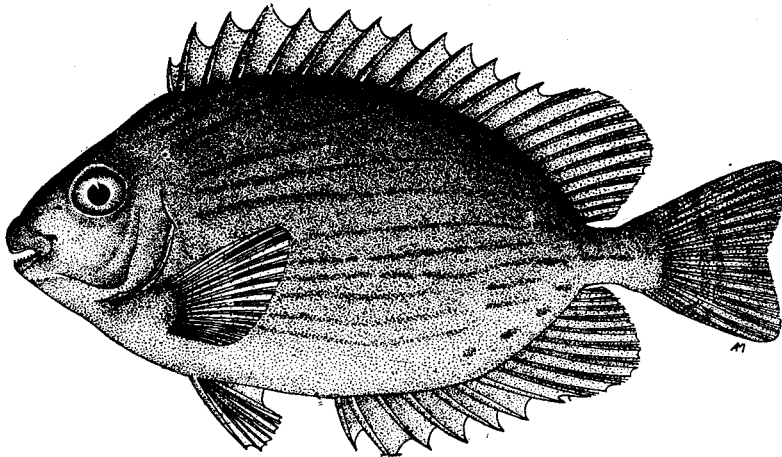


FIG. 466. *Siganus javus* (Linnaeus), 142 mm.

Specimen studied: Minicoy (1), 142 mm.

D. XIII, 10; A. VII, 9; P. ii, 15; V. I, 3, I.

Head 3.9 in standard length, 4.9 in total length. Depth of body 2.0 in standard length, 2.4 in total length. Eye 3.3 in head, 1.4 in snout and about 1.2 in convex interorbital space. First dorsal spine as long as diameter of eye; sixth spine longest, much longer than snout; following spines decreasing in length, the last as long as snout. Pectoral slightly longer than head without snout. Ventral shorter than pectoral. Caudal fin emarginate. More than 30 scales between median dorsal spines and lateral line. Soft dorsal and anal angular. Colour: Brownish becoming lighter on the abdomen. Sides with several brown wavy lines, those on back broken up into spots. Dorsal, anal, caudal and ventral brown. Pectoral pale yellowish.

Local name: *Vori* (Minicoy).

Distribution: Coasts of Arabia, Laccadives, India, Ceylon, Andamans, Malaysia, Philippines, coasts of Australia, New Hebrides and Tahiti.

Suborder ACANTHUROIDEI

Elongate oblong, compressed body with minute scales. Teeth small, setiform or lobate. Lateral line complete. Anal with II or III spines. Bony plates or

spines often present on caudal peduncle. A single dorsal fin composed of spines anteriorly and branched rays posteriorly. Ventrals thoracic with one spine and 3 to 5 rays.

No bony plates or spine laterally on caudal peduncle; teeth slender and bristle like; third spine of dorsal filamentous ZANCLIDAE

One or more bony plates or spines laterally on caudal peduncle; teeth short, lobate or setiform; third spine of dorsal not filamentous ACANTHURIDAE

Family ZANCLIDAE

Deep, compressed body. Mouth small, terminal with produced jaws. Teeth elongate, setiform. Branchial opening lateral, extending from level of eye to front of pectoral base. Dorsal fin with VII spines, the first two minute, the third produced into a filament and 38 to 41 rays. Anal with III spines and 33 to 36 rays. Scales minute, ciliated. Lateral line strongly arched.

A pair of interorbital bony protuberances in young developing to a pair of horns in adult *Zanclus cornutus*

A strong recurved spine slightly above angle of mouth *Zanclus canescens*

467. *Zanclus cornutus* (Linnaeus)

Chaetodon cornutus Linnaeus, Syst. Nat., ed. 10, 1, p. 273, 1758.

Zanclus cornutus Day, Fishes of India, p. 111, pl. 28, fig. 4, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 170, fig. 43 and 44, 1936. Smith, Fishes of Southern Africa, p. 241, pl. 34, fig. 618, 1949. Munro, Fishes of Ceylon, p. 211, pl. 42, fig. 623, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 301, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 124/392).

Specimens studied: Agathi (3), 70 to 123 mm. Ameni (2), 61 and 72 mm. Kavarathi (3), 125 to 131 mm. Minicoy (8), 54 to 120 mm.

D. VII, 39-41; A. III, 33-36; P. ii, 16; V. I, 5.

Body strongly compressed and elevated dorso-ventrally. Snout produced, profile of snout concave. Head 2.2-2.5 in standard length, 2.9-3.2 in total length. Depth of body 1.15-1.25 in standard length, 1.40-1.45 in total length. Eye 3.5-4.3 in head, 1.9-2.5 in snout and equal to or a little more than inter-orbital space. A pair of interorbital protuberances in young developing as horns in adult. Teeth slender, bristle like. First two dorsal spines short and strong; third spine greatly elongated and filamentous, equal to or more than total length; rest of the spines and dorsal rays gradually becoming shorter. First two anal spines short, third spine $\frac{3}{5}$ length of succeeding ray; rays gradually becoming shorter posteriorly. Pectoral and ventral subequal, much shorter than

snout and eye together. Colour: Yellowish white with two broad black cross bands; the first one extending from interorbital and dorsal origin down to sides of breast to vent and the other from front part of soft dorsal to anterior part of soft anal; a dark vertical line immediately behind it. Four white lines present on the anterior band, one from behind interorbital protuberances to the eye, one from anterior to dorsal origin to eye, one from lower side of operculum towards ventral fin and the other from front of pectoral towards vent. A blackish saddle over snout; lower lip and angle of mouth black. Rays of dorsal and anal edged dark. Caudal with a broad black crescent, posterior margin whitish. Pectoral pale. Ventral blackish.

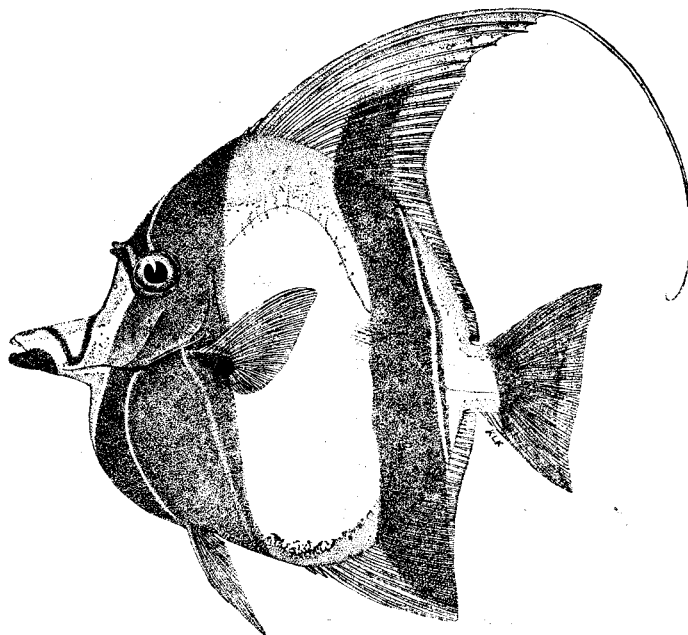


FIG. 467. *Zaclus cornutus* (Linnaeus), 120 mm.

Local names: *Didanegi* (Minicoy). *Kodiyar* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India and Ceylon, Malaysia, Indonesia, Philippines, Japan and Samoan, Society and Hawaiian Islands.

468. *Zaclus canescens* (Linnaeus)

Chaetodon canescens Linnaeus, Syst. Nat., ed. 10, 1, p. 272, 1758.

Zaclus canescens Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 7, p. 172, fig. 45, 1936. Smith, Fishes of Southern Africa, p. 241, 1949. Balan, J. Bombay nat. Hist. Soc., 65, p. 302, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 124/393).

Specimens studied: Chetlat (1), 60 mm. Kavarathi (1), 56 mm. Minicoy (7), 53 to 68 mm.

D. VII, 38-41; A. III, 33-35; P. ii, 16; V. I, 5.

Body highly compressed and elevated dorso-ventrally. Head 2.5-2.7 in standard length, 3.2-3.4 in total length. Depth of body 1.00-1.15 in standard length, 1.25-1.40 in total length. Eye 3.0-3.2 in head, 1.5-1.6 in snout and about 0.8 in convex interorbital space. Dorsal profile of snout highly concave. Teeth in jaws slender and bristle like. No interorbital horns. A strong recurved spine on the preorbital above corner of mouth. First two dorsal spines short and stout, third spine filamentous, more than total length. Colour: Yellowish white with two broad blackish cross bands; the first from interorbital and insertion of dorsal to the sides of breast and before vent and another from anterior part of soft dorsal to anterior part of soft anal. Four white lines present on the anterior blackish band, two directed upwards from eye, one from opercular area downwards to ventral origin and another from front of pectoral towards vent. Snout blackish, chin dusky. Caudal with a blackish crescent, posterior margin whitish. Ventral blackish.

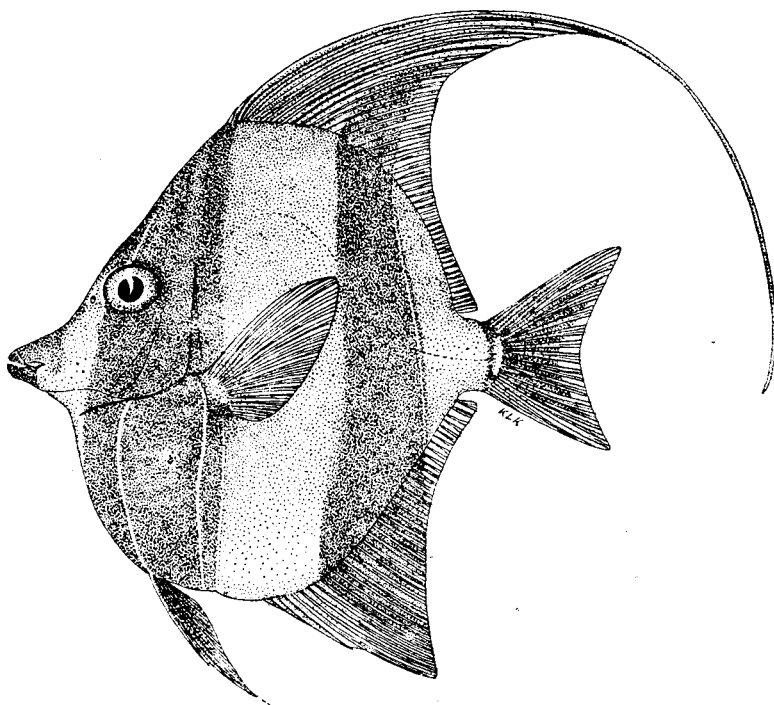


FIG. 468. *Zanclus canescens* (Linnaeus), 68 mm.

Local names: *Didanegi* (Minicoy). *Kodiyan* (other islands).

Distribution: East coast of South Africa, Laccadives, Indonesia, Philippines, Hawaii and Tahiti.

Family ACANTHURIDAE

Moderately elongate and compressed. Mouth small, terminal. Teeth somewhat compressed, sometimes denticulated. Palate edentulous. Dorsal fin single, consisting of a spinous and a soft part. Anal with II or III spines and several rays as that of dorsal. Ventral with I spine and 3 to 5 rays. Gill membranes broadly attached to isthmus. Pseudobranchiae present. Caudal peduncle with one erectile antrorse spine or 1 or 2 immovable bony bucklers on each side. Scales minute, rough; lateral line complete.

1. III anal spines. Caudal peduncle with one antrorse spine on each side ... 2
 II anal spines. Caudal peduncle with one or two bony bucklers each with a raised keel or rigid spine 12
2. Teeth long, movable on pedicels, tips expanded and denticulate on outer side. D. VIII (IX), 27-29. A. III, 24-25. Sides of body often with numerous longitudinal light bluish lines *Ctenochaetus strigosus*
 Teeth immovable, broad, both inner and outer margins of expanded tips denticulate 3
3. Ventrals with 3 soft rays *Paracanthurus hepatus*
 Ventrals with 5 soft rays 4
4. D. IV, 29-30. A. III, 23-25. Body deep. Dark brown with oblique light transverse bands on sides *Zebrasoma veliferum*
 VIII-IX dorsal spines 5
5. Sides with 6 dark transverse bands on a greyish or light brownish background, the last band as a pair of spots on caudal peduncle *Acanthurus triostegus triostegus*
 Sides without transverse bands 6
6. A light ring round the mouth or lower jaw 7
 No light ring round the mouth 8
7. Brownish with a whitish area across lower jaw. Depth of body 1.6 in length *Acanthurus aliala*
 Head deep blue, body bluish grey to dark bluish brown; chest and the area around mouth yellowish *Acanthurus leucosternon*
8. 9 or 10 light blue longitudinal blackish bordered bands on sides of body continued on to the head; a blue transverse band blackish bordered at base of caudal *Acanthurus lineatus*
 No longitudinal bands as above 9

9. Two black elongate marks backwards behind upper edge of gill opening.
Caudal spine in an oblong dark area *Acanthurus tennentii*
One elongate mark backwards from upper edge of gill opening. Groove
of caudal spine with the black tapering stripe extending forward
..... *Acanthurus nigricans*
No black mark on shoulder 10
10. Corner of mouth equidistant from hind border of preopercle and from eye.
9 teeth on each side of upper jaw and 12 on each side of lower jaw. 24
dorsal rays. Caudal pale yellowish, contrasted with colour of body
..... *Acanthurus philippinus*
Corner of mouth nearer to hind border of preopercle than to eye 11
11. 8 or 9 rather slender teeth on each side of both jaws. A dark postocular
blotch; area adjoining caudal spine blackish; dorsal and anal with light
longitudinal bands *Acanthurus matoides*
8 strongly lobate teeth on each side of upper jaw and 9 on each side of
lower jaw. Blackish brown with a few pale streaks on cheek; dorsal edge
of gill opening blackish; caudal spine in a black sheath. Fins blackish
..... *Acanthurus mata*
5 or 6 strongly lobate teeth on each side of upper jaw and 6 or 7 on each side
of lower jaw; axil of last 2 or sometimes 3 dorsal and anal rays black
..... *Acanthurus elongatus*
12. Teeth 30 or less in each jaw with entire edges obtusely rounded apically.
No preocular or rostral protuberance. A yellowish band from eye to
behind corner of mouth joined to another pale band along preopercle
border; a yellowish area above and behind eye and yellowish area around
caudal bucklers *Naso lituratus*
Teeth small, numerous, the distal edges serrate. A frontal horn or a protube-
rance present 13
13. A free protruding frontal horn like process present 14
No free protruding frontal horn like process or hump before eye 16
14. A distinct hump on back beginning at the base of fourth dorsal spine. V
dorsal spines *Naso brachycentron*
Dorsal profile without distinct hump or elevation. VI dorsal spines 15
15. Lower edge of base of horn at least thrice further from tip of snout than
from front border of eye *Naso unicornis*
Lower edge of base of horn about twice further from front border of eye
than from tip of snout *Naso brevirostris*
16. V dorsal spines. Dorsal rays less than half length of head. A hump on fore-
head in adults. Caudal fin not filamentous. Head, back and sides with
small blackish spots *Naso tuberosus*

VI dorsal spines. Dorsal almost as long as head. Dorsal profile smooth. Caudal with filaments. Several bluish black vertical stripes on sides and scattered blackish spots on cheek, back and lower part of trunk

..... *Naso vlamingi*

469. *Ctenochaetus strigosus* (Bennett)

Acanthurus strigosus Bennett, Zool. Jour., 4, p. 41, 1828. Day, Fishes of India, p. 207, pl. 47, fig. 2, 1878.

Ctenochaetus strigosus de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 128, fig. 24, 1951. Smith, Fishes of Southern Africa, p. 240, pl. 33, fig. 614, 1949. Munro, Fishes of Ceylon, p. 212, pl. 41, fig. 624, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 125/394).

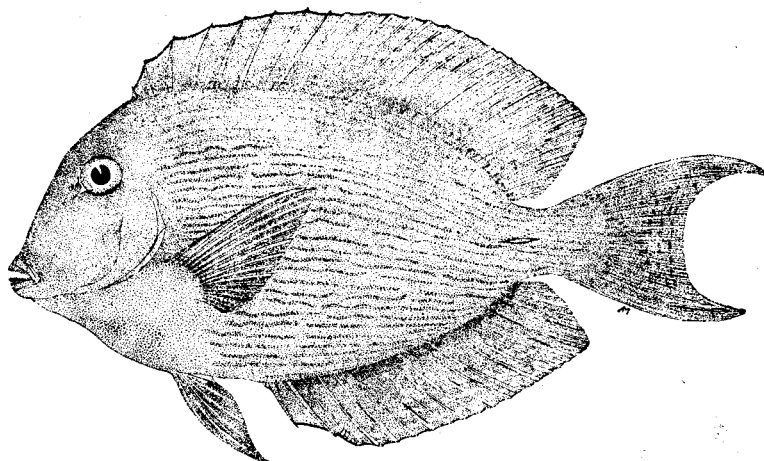


FIG. 469. *Ctenochaetus strigosus* (Bennett), 103 mm.

Specimens studied: Agathi (9), 30 to 47 mm. Ameni (1), 86 mm. Bitra (8), 115 to 136 mm. Kadamat (1), 36 mm. Kavarathi (16), 31 to 103 mm. Minicoy (2), 67 and 125 mm.

D. VIII-IX, 27-29; A. III, 24-25; P. ii, 14-15; V. I, 5. Ll. about 115; Ltr. 13+39-44.

Head 3.3-3.4 in standard length, 4.5-4.7 in total length. Depth of body 1.9-2.0 in standard length, 2.5-2.7 in total length. Eye 3.4-3.7 in head, 1.7-2.0 in snout and 1.2 in convex interorbital space. Teeth long, slender, movable and bristle like with expanded tips serrulated, 24 to 36 in upper jaw and 32 to 40 in lower jaw. First dorsal spine minute, spines increasing in length to the last measuring 2.2-2.3 eye diameter. First anal spine very small, third longest, 1.6-1.7 eye diameter. Pectoral longer than head. Ventral slightly shorter than head. Caudal deeply emarginate, lobes pointed, upper lobe slightly longer than the lower. Colour: Uniform dark brown to chocolate brown, some specimens with greenish

tinge posteriorly, often with numerous narrow wavy longitudinal pale to light bluish lines on sides of body and tail. Dorsal and anal dark violet to blackish brown with pale bluish longitudinal bands. Caudal dark violet with indications of dark spots in distal third of the fin. Pectoral pale hyaline, rays dusky, upper border narrowly edged with dark. Ventral dark brown, basal part of inner 2 or 3 rays lighter.

Local names: *Rykathi* (Minicoy). *Pala* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Ceylon, Andamans, Indonesia, Philippines, Japan and Tuamotu, Marquesas and Hawaiian Islands.

470. *Paracanthurus hepatus* (Linnaeus)

Teuthis hepatus Linnaeus, Syst. Nat., ed. 12, 1, p. 507, 1766 (in part).

Acanthurus hepatus Day, Fishes of India, p. 206, 1878.

Paracanthurus hepatus de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 131, 1951. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 125/395).

Paracanthurus theuthis Smith, Fishes of Southern Africa, p. 239, pl. 33, fig. 607, 1949.

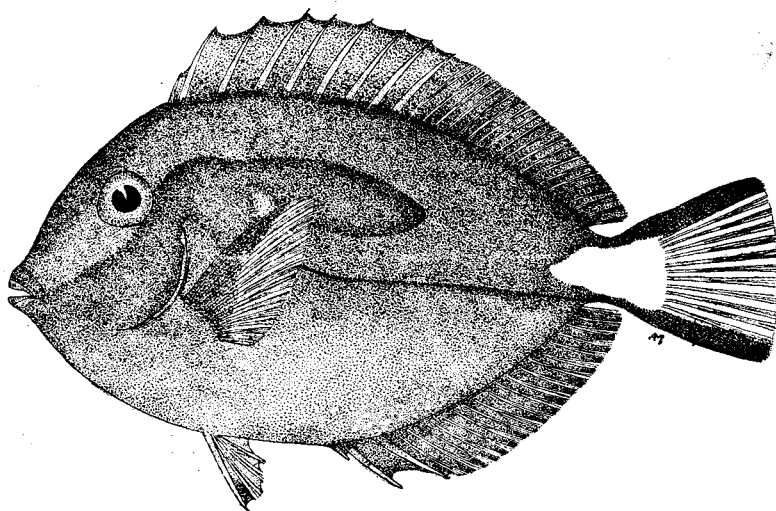


FIG. 470. *Paracanthurus hepatus* (Linnaeus), 62 mm.

Specimens studied: Ameni (1), 62 mm. Minicoy (4), 43 to 110 mm.

D. IX, 19-20; A. III, 19; P. ii, 14-15; V. I, 3.

Head 3.5-3.8 in standard length, 4.3-4.5 in total length. Depth of body 1.9-2.0 in standard length, 2.3-2.4 in total length. Eye 3.2-3.6 in head, 1.7 in snout and equal to convex interorbital space. Teeth lobate, 6 on each side of

both jaws. First dorsal spine $\frac{1}{3}$ of second, fourth spine longest, about twice eye diameter, subsequent spines gradually decreasing in length. First dorsal ray as long as longest dorsal spine, rays gradually decreasing in length. First anal spine short, 2nd about $\frac{2}{3}$ of third, it being about equal to longest dorsal spine. Anal rays gradually decreasing in length. Pectoral as long as head, ventral about $\frac{1}{2}$ length of head. Colour: Grey brown, lighter below. A dark brown broad band from eye along base of dorsal and back, broadening before caudal peduncle; a forward extension from caudal spine to above pectoral; dark area of back continued along upper and lower border of caudal peduncle and caudal fin; intervening area of caudal peduncle and caudal fin yellowish. Dorsal and anal dark greyish, edges of fins darker. Basal half of pectoral brown, distal half pale yellowish. Ventral pale, hind edge slightly brownish.

Local names: *Voulang* (Minicoy). *Chankatayan* (other islands).

Distribution: East coast of South Africa, Laccadives, coasts of India, Indonesia, Philippines, Bismarck Archipelago and Gilbert Islands.

471. *Zebrasoma veliferum* (Bloch)

Acanthurus velifer Bloch, *Natarges. Ausl. Fisch.*, 3, p. 106, pl. 427, fig. 1, 1795.

Acanthurus velifer Day, *Fishes of India*, p. 207, 1878.

Zebrasoma veliferum de Beaufort, *Fishes of the Indo-Australian Archipelago*, 9, p. 167, fig. 28, 1951. Smith and Smith, *Fishes of Seychelles*, p. 25, pl. 18, G, 1963. Jones, *Bull. cent. mar. Fish. Res. Inst.*, 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 125/396).

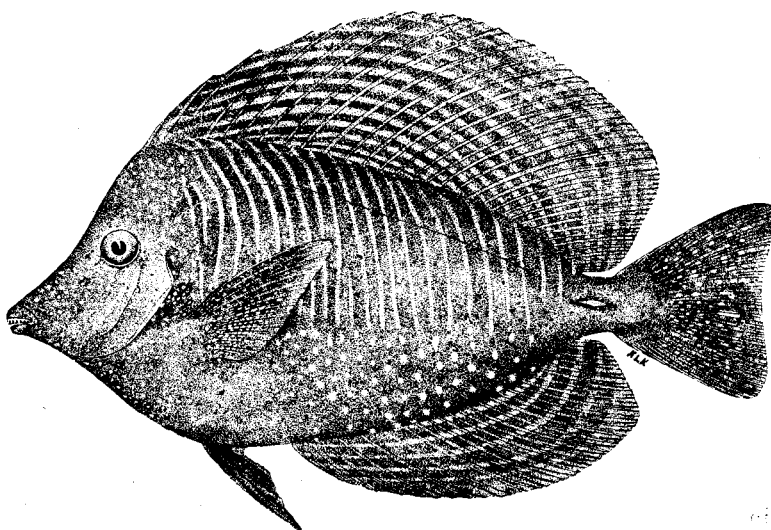


FIG. 471. *Zebrasoma veliferum* (Bloch), 200 mm.

Specimens studied: Agathi (1), 182 mm. Ameni (1), 172 mm. Bangaram (1), 189 mm. Chetlat (2), 188 and 205 mm. Minicoy (1), 200 mm.

D. IV, 29-30; A. III, 23-25; P. ii, 14; V. I, 5.

Head 3.6-4.0 in standard length, 4.5-4.9 in total length. Depth of body 1.9-2.1 in standard length, 2.4-2.6 in total length. Eye 3.8-4.3 in head, 2.5-2.7 in snout and 1.3 in convex interorbital space. Dorsal profile of snout concave, slightly produced. 6 to 8 strongly lobate teeth on each side of both jaws. Dorsal very elevated, first dorsal spine small, last dorsal spine as long as head, 4th to 6th rays of dorsal longest, a little less than height of body. Anal also elevated, 6th to 9th rays longest, as long as head. Pectoral as long as head, ventral shorter than head. Caudal truncate. Colour: Dark bluish brown to blackish brown with several obliquely transverse light bands on sides of body; sides of head, breast and lower sides of body with light spots. Dorsal dark brown with 9 to 12 light bands running somewhat parallel to the outer border of the fin. Anal dark brown with 4 to 6 light bands. Pectoral light brown with whitish spots at basal half. Ventral dark brown. Caudal dark brown with pale spots.

Local names: *Gali-voulang* (Minicoy). *Churiyan* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Indonesia, Philippines and Ryukyu, Gilbert, Solomon, Society, Tuamotu and Hawaiian Islands and south to Australia.

472. *Acanthurus triostegus triostegus* (Linnaeus)

Chaetodon triostegus Linnaeus, Syst. Nat., ed. 10, 1 p. 274, 1758.

Acanthurus triostegus Day, Fishes of India, p. 204, pl. 48, fig. 2, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 144, 1951. Smith, Fishes of Southern Africa, p. 240, pl. 33, fig. 608, 1949. Munro, Fishes of Ceylon, p. 213, pl. 41, fig. 626, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959.

Acanthurus triostegus triostegus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 125/397).

Specimens studied: Agathi (9), 113 to 129 mm. Ameni (8), 81 to 98 mm. Androth (14), 93 to 114 mm. Bitra (209), 21 to 98 mm. Chetlat (53), 96 to 108 mm. Kadamat (17), 41 to 93 mm. Kalpeni (44), 41 to 97 mm. Kavarathi (55), 14 to 131 mm. Minicoy (19), 75 to 119 mm.

D. IX, 22-23; A. III, 20-21; P. ii, 13-14; V. I, 5. Ll. 150-158; Ltr. 17-19 +70-75.

Head 3.1-3.4 in standard length, 3.8-4.2 in total length. Depth of body 1.8-2.1 in standard length, 2.2-2.5 in total length. Eye 3.3-4.0 in head, 1.8-2.1 in snout and 1.2-1.3 in convex interorbital space. Teeth deeply lobate, 6 to 8 on each side of both jaws. First spine of dorsal about one third of second, spines

progressively increasing in length to the 6th to 9th, they being subequal. First anal spine short, second spine about $\frac{1}{4}$ th of the third, it being equal to longest dorsal spines. Pectoral about $\frac{1}{2}$ eye diameter shorter than head, ventral shorter than pectoral. Caudal truncate. Colour: Head and body greyish to light brownish, yellowish white on lower sides, the two colours often separated by a brownish undulating stripe from chin to end of anal in large specimens. Five dark cross bands on sides and two elongate spots, one above the other on caudal peduncle. Dorsal and anal greyish to dark. Caudal greyish, hind border pale white. Pectoral hyaline. Median rays of ventral dusky to greyish, rest of the fin pale.

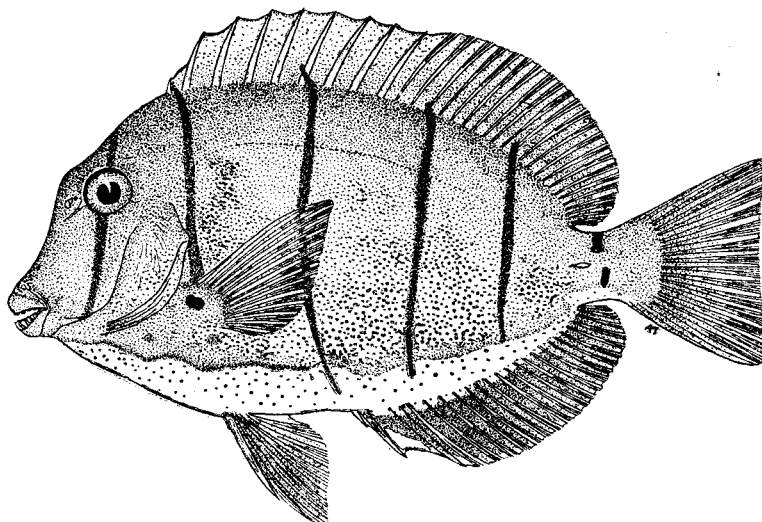


FIG. 472. *Acanthurus triostegus triostegus* (Linnaeus), 118 mm.

Local names: *Rabolu* (Minicoy). *Nelalan*, *Kurichil* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan, Australia and Clarion and Clipperton Islands.

473. *Acanthurus aliala* Lesson

Acanthurus aliala Lesson, Voy. Coquille, Zoology, 2, p. 150, 1830. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 125/398).

Acanthurus glaucopareius Cuvier and Valenciennes, Hist. Nat. Poissons, 10, p. 190, 1835. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 138, 1951.

Specimen studied: Agathi (1), 50 mm.

D. IX, 29; A. III, 27; P. ii, 14; V. I, 5.

Head 3.4 in standard length, 4.2 in total length. Depth of body 1.6 in standard length, 2.0 in total length. Eye 2.7 in head, a little less than snout

and equal to interorbital space. Dorsal profile of snout concave. Corner of mouth nearer to hind border of preopercle than to eye. Last dorsal spine longest, about 1.4 eye diameter. Third anal spine about 1.2 eye diameter. Soft dorsal and anal rounded. Pectoral slightly longer than head. Ventral as long as snout and eye together. Colour: Brownish, lighter below, sides of body sometimes with five brown cross bars; a white area across lower jaw. Fins pale; dorsal, anal and caudal darker distally.

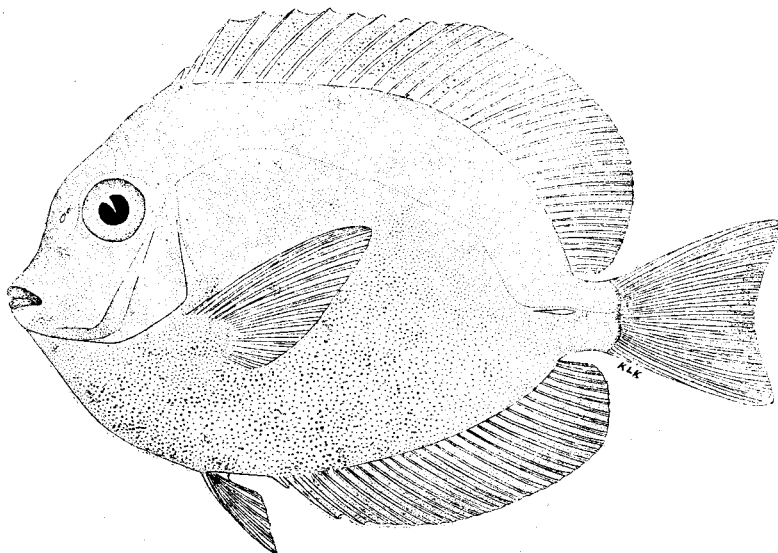


FIG. 473. *Acanthurus aliala* Lesson, 50 mm.

Distribution: Laccadives, Indonesia, Philippines and Mariana, Society, Caroline, Marquesas and Hawaiian Islands and Socorro and Clarion Islands off Central America.

Note: The specimen described above is an early juvenile differing appreciably in body proportions and colouration from the adult. This appears to be closer to *A. aliala* than to *A. achilles* Shaw.

474. *Acanthurus leucosternon* Bennett

Acanthurus leucosternon Bennett, Proc. Zool. Soc., London, p. 183, 1832. Day, Fishes of India, p. 203, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 139, fig. 26, 1951. Munro, Fishes of Ceylon, p. 213, pl. 41, fig. 625, 1955. Jones and Kumaran, Indian J. Fish. 6, pp. 48 and 51, fig. 6, b, 1959. Smith, Fishes of Southern Africa, ed. 4, p. 518, pl. 106, 609 a, 1961. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 125/399).

Specimens studied: Agathi (9), 57 to 133 mm. Ameni (3), 62 to 84 mm. Bangaram (1), 126 mm. Bitra (2), 130 and 140 mm. Chetlat (3), 70 to 95 mm. Kavarathi (1), 139 mm. Minicoy (5), 80 to 130 mm.

D. IX, 28-31; A. III, 26-28; P. ii, 14; V. I, 5. Ll. 179-194; Ltr. 17-20 +76-79.

Head 3.4-3.7 in standard length, 4.4-4.6 in total length. Depth of body 1.7-1.9 in standard length, 2.2-2.4 in total length. Eye 3.4-3.8 in head, 2.2-2.5 in snout and 1.2-1.3 in highly convex interorbital space. Dorsal profile of snout rather concave. 5 or 6 large truncate and lobate teeth on each side of both jaws. First spine of dorsal minute, subsequent spines increasing in length to the last measuring more than twice eye diameter. First anal spine minute, third longer than second, but shorter than last dorsal spine. Pectoral equal to or slightly longer than length of head, ventral much shorter than head. Caudal emarginate. Colour: Head deep blue, body bluish grey to dark bluish brown, caudal peduncle lighter, chest and a ring encircling hind part of mouth yellowish. A blackish patch between pectoral base and upper edge of gill opening. Dorsal yellowish, orange towards base with a narrow white outer border and a blackish submarginal line. Anal pale yellow to greyish, orange towards base, outer border white. Caudal yellowish, a brown crescentic band across its base and continued along upper and lower edges of the fin and joined to a wide submarginal brown band, outer border of the fin white. Pectoral yellowish, ventral pale greyish with whitish outer edge.

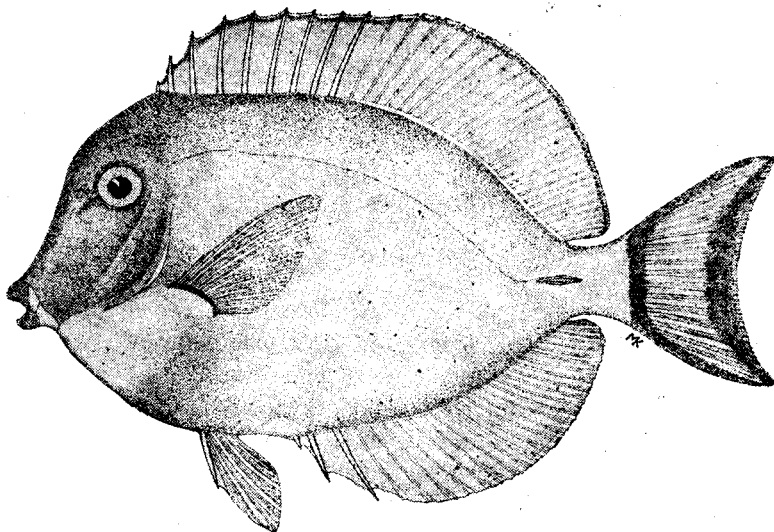


FIG. 474. *Acanthurus leucosternon* Bennett, 140 mm.

Local names: *Voulang* (Minicoy). *Alakan* (other islands).

Distribution: East coast of Africa, Zanzibar, Mauritius, Seychelles, Laccadives, Ceylon and Indonesia.

475. *Acanthurus lineatus* (Linnaeus)

Chaetodon lineatus Linnaeus, Syst. Nat., ed. 10, p. 274, 1758.

Acanthurus lineatus Day, Fishes of India, p. 203, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 147, 1951. Smith, Fishes of Southern Africa, p. 240, pl. 33, fig. 610, 1949. Munro, Fishes of Ceylon, p. 213, pl. 41, fig. 627, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 125/400).

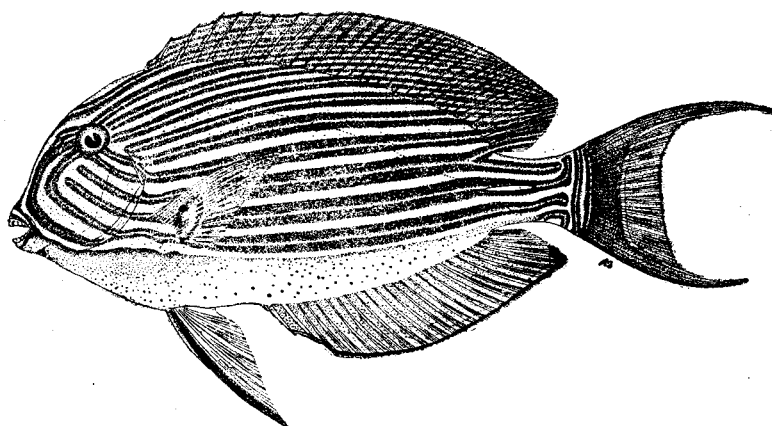


FIG. 475. *Acanthurus lineatus* (Linnaeus), 154 mm.

Specimens studied: Agathi (4), 113 to 151 mm. Ameni (2), 69 and 132 mm. Bangaram (1), 156 mm. Chetlat (2), 110 and 121 mm. Kavarathi (9), 49 to 162 mm. Minicoy (10), 64 to 105 mm. Suheli (5), 83 to 164 mm.

D. IX, 27-29; A. III, 26-28; P. ii, 14-15; V. I, 5. LI. 97-108; Ltr. 8-9 +28-30.

Head 3.5-4.0 in standard length, 4.7-5.4 in total length. Depth of body 2.0-2.3 in standard length, 2.6-3.0 in total length. Eye 3.5-4.0 in head, 2.0-2.4 in snout and 1.3-1.4 in convex interorbital space. 6 or 7 large lobate teeth on each side of both jaws. First spine of dorsal small, second spine about $\frac{2}{3}$ of third, subsequent spines increasing in length gradually, 5th to 9th subequal. First anal spine short, second $\frac{3}{4}$ th of third, it being as long as longest dorsal spines. Pectoral slightly longer than head, ventral equal to or longer than pectoral. Caudal lobes pointed and produced. Colour: Canary yellow; sides and back with 9 or 10 light blue bands broadly bordered by blackish bands separated by very narrow pale bands directed towards the dorsal and the base of caudal, the two upper and three lower blackish bands continued on to snout where they bend and follow profile. A vertical bluish band at base of caudal bordered with black. Dorsal fin dark violet with light longitudinal bands and with

blackish margin. Anal violet with black submarginal band and a narrow white outer edge. Caudal dark with a semilunate white band in the middle and bordered with black. Pectoral pale, with a dark band at base. Ventral yellowish, the spine and first ray black.

Local names: *Haravalu-rykathi* (Minicoy). *Varipad* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Marshall, New Hebrides, Society, Christmas, Tahiti and Marquesas Islands.

476. *Acanthurus tennenti* Günther

Acanthurus tennenti Günther, Cat. Fish. Brit. Mus., 3, p. 37, 1861. Smith and Smith, Fishes of Seychelles, p. 24, pl. 21, L, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 25, 1969 (Cat. No. CMFRI-LA-F. 125/401).

Acanthurus bicommat Smith, Ann. Mag. Nat. Hist., (12) 8, p. 694, pl. 18, figs. C and D, 1955.

Acanthurus tennentii Day, Fishes of India, p. 204, 1878. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958.

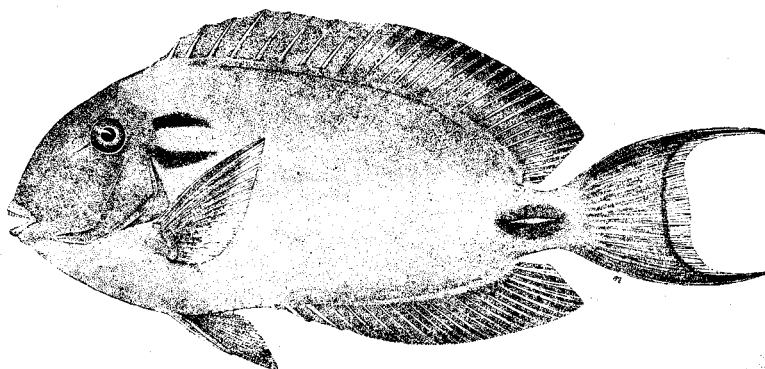


FIG. 476. *Acanthurus tennenti* Günther, 180 mm.

Specimens studied: Agathi (1), 180 mm. Bitra (1), 172 mm. Kavarathi (1), 127 mm. Kiltan (1), 111 mm. Minicoy (4), 115 to 155 mm.

D. IX, 23-24; A. III, 22-23; P. ii, 15; V. I, 5. Ll. 145-157; Ltr. 14-16 +62-73.

Head 3.4-3.7 in standard length, 4.7-5.0 in total length. Depth of body 2.2-2.3 in standard length, 2.8-3.0 in total length. Eye 3.7-4.1 in head, 2.2-2.5 in snout and 1.2-1.4 in highly convex interorbital space. 8 teeth on each side in upper jaw, 8 or 9 teeth on each side in lower jaw. Corner of mouth nearly to hind border of preopercle than to eye. First dorsal spine small, 2nd twice

as long as first, subsequent spines increasing in length, 6th to 9th subequal, about $1\frac{1}{4}$ eye diameter. First anal spine short, third longer than second but much shorter than longest dorsal spines. Pectoral equal to or a little less than length of head, ventral shorter than pectoral. Caudal lobes pointed, increasingly produced with age. Colour: Dark brown, head darker than body, with two black marks at humeral region. Caudal spine in an oblong dark area. Dorsal and anal dusky brown. Caudal dusky brown, base lighter, posterior margin broadly white with submarginal blackish line and narrow white lower and upper edges on lobes. Pectoral dark brown with broad white outer margin. Ventral brownish, darker distally.

Local names: *Rykathi* (Minicoy). *Pala*, *Neythala*, *Karutha-kotti* (other islands).

Distribution: East coast of Africa and neighbouring islands, Laccadives, coasts of India and Ceylon.

477. *Acanthurus nigricans* (Linnaeus)

Chaetodon nigricans Linnaeus, Syst. Nat., ed. 10, p. 274, 1758.

Acanthurus gahm de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 150, 1951.

Acanthurus gahm Smith and Smith, Fishes of Seychelles, p. 24, pl. 21, H, 1963.

Acanthurus nigricans Jones, Bull. cent. mar. Fish Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/402).

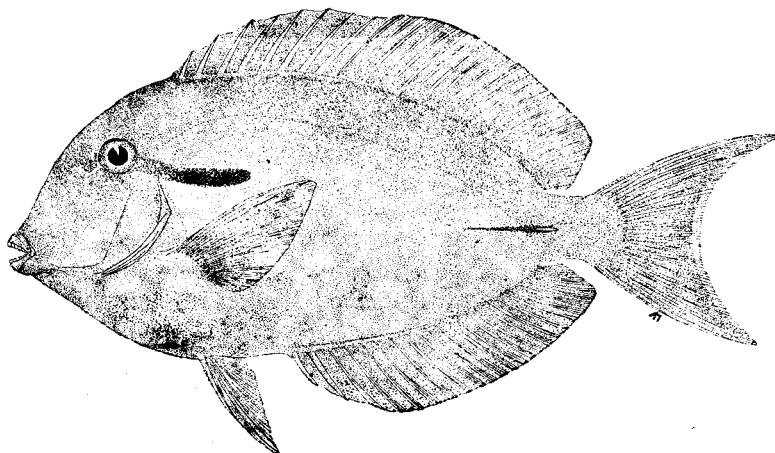


FIG. 477. *Acanthurus nigricans* (Linnaeus), 152 mm.

Specimens studied: Agathi (1), 152 mm. Ameni (3), 84 to 193 mm. Kavarathi (1), 75 mm. Minicoy (7), 39 to 180 mm.

D. IX, 26-28; A. III, 24-26; P. ii, 14-15; V. I, 5. Ll. 138-145; Ltr. 13-14+62-70.

Head 3.4-3.8 in standard length, 4.6-5.3 in total length. Depth of body 2.0-2.3 in standard length, 2.6-3.1 in total length. Eye 3.9-4.3 in head, 2.3-2.6 in snout and 1.3-1.5 in highly convex interorbital space. Corner of mouth nearer to hind border of preopercle than to eye. Eight lobate teeth on each side of both jaws. First dorsal spine very small, second about twice as long as the first, subsequent spines increasing in length, 7th to 9th subequal, about twice eye diameter. First anal spine short, 3rd longer than 2nd and slightly shorter than longest dorsal spines. Pectoral equal to length of head, ventral shorter than pectoral. Caudal lunate, the lobes produced. Colour: Dark brown with an elongate black bar from behind upper edge of gill opening to above middle of pectoral. Groove of caudal spine black with the black tapering stripe extending forward on side. Dorsal and anal dark brown with a narrow black edge. Caudal lighter to dark brown with a whitish hind margin. Posterior part of caudal peduncle and base of caudal abruptly white in small specimens. Pectoral dark brown, hind border broadly whitish. Ventral dark brown, inner rays sometimes lighter basally.

Local names: *Rykathi* (Minicoy). *Pala* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Indonesia, Philippines and Solomon, Samoan, Gilbert, Society, Tuamotu and Hawaiian Islands.

478. *Acanthurus philippinus* Herre

Acanthurus philippinus Herre, Philippine Jour. Sci., **34**, p. 434, pl. 5, fig. 1, 1927. de Beaufort, Fishes of the Indo-Australian Archipelago, **9**, p. 161, 1951. Jones and Kumaran, J. Mar. biol. Ass. India, **7**, p. 392, fig. 13, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/403).

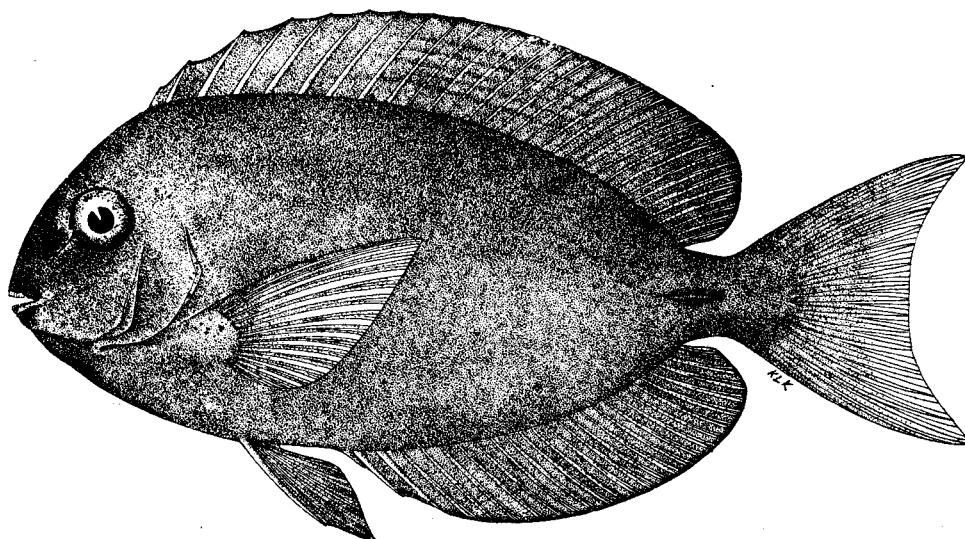


FIG. 478. *Acanthurus philippinus* Herre, 95 mm. (after Jones and Kumaran)

Specimen studied: Minicoy (1), 95 mm.

D. IX, 24; A. III, 23; P. ii, 14; V. I, 5. Ll. about 150; Ltr. 12+52.

Head 3.8 in standard length, 5.0 in total length. Depth of body 2.1 in standard length, 2.7 in total length. Eye 3.2 in head, 1.2 in snout and about 1.2 in convex interorbital space. Dorsal profile of head convexly rounded. Corner of mouth slightly nearer to eye than to hind border of preopercle. Teeth serrate, 9 on each side of upper jaw and 12 on each side of lower jaw. First dorsal spine short, spines increasing in length to the last, it being about twice eye diameter in length. Third anal spine about 1.5 eye diameter. Pectoral longer than head; ventral short, about 2/5 eye diameter shorter than head. Colour: Dark chocolate brown. Dorsal and anal chocolate brown with narrow blackish edges; dorsal with 5 indistinct narrow dark lines. Caudal pale yellowish, sharply contrasted with general body colour. Pectoral dark greyish becoming pale yellowish posteriorly. Ventral dark brown.

Local name: *Kalahandi* (Minicoy).

Distribution: Laccadives, Indonesia, Philippines and Rongelap Island.

479. *Acanthurus matoides* Valenciennes

Acanthurus matoides Cuvier and Valenciennes, Hist. Nat. Poissons, 10, p. 204, 1835. Day, Fishes of India, p. 205, 1878. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 156, 1951. Munro, Fishes of Ceylon, p. 214, pl. 41, fig. 631, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/404).

Acanthurus xanthopterus Smith and Smith, Fishes of Seychelles, p. 25, pl. 21, F, 1963.

Specimens studied: Agathi (8), 47 to 160 mm. Ameni (8), 83 to 187 mm. Minicoy (12), 49 to 390 mm.

D. (VIII) IX, 25-27; A. III, 23-25; P. ii, 15; V. I, 5. Ll. about 170-195; Ltr. 16-19+70-80.

Head 3.3-3.7 in standard length, 4.3-4.8 in total length. Depth of body 1.8-2.2 in standard length, 2.4-2.8 in total length. Eye 3.6-5.2 in head, 2.0-3.0 in snout and 1.2-1.4 in convex interorbital space. Corner of mouth nearer to hind border of preopercle than to eye. 8 or 9 lobate teeth on each side of both jaws. First dorsal spine small, the following spines increasing in length to the last, it being about 2½ eye diameter or more in length. Third anal spine twice eye diameter in length. Caudal lunate, lobes pointed. Colour: Dark brown with violet tinge. A dark postocular blotch in very large specimens. Area adjoining caudal spine blackish. Dorsal and anal dark brown to violet with 5 to 7 light longitudinal bands and often with very narrow blackish edge. Basal two-thirds of

pectoral brownish, posterior third pale. Caudal dark brown, base sometimes lighter. Ventral dark brown. In small specimens, posterior part of caudal, peduncle and base of caudal white; pectoral white, dusky basally.

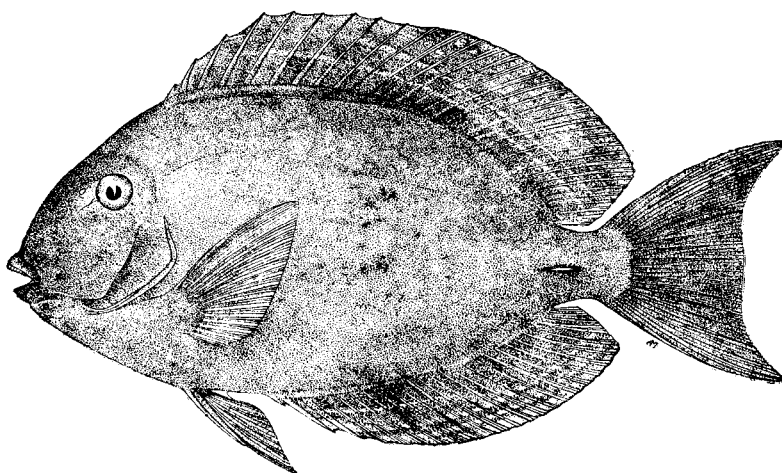


FIG. 479. *Acanthurus matoides* Valenciennes, 160 mm.

Local names: *Kalahandi*, *Rykathi* (Minicoy). *Pala*, *Neythala* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Australia and Society, Tuamotu, Marquesas and Hawaiian Islands.

480. *Acanthurus mata* Valenciennes

Acanthurus mata Cuvier and Valenciennes, Hist. Nat. Poissons, 10, p. 202, 1835. Day, Fishes of India, p. 205, pl. 48, fig. 1, 1878 (synonymy in part). Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/405).

Acanthurus gahm Munro, Fishes of Ceylon, p. 214, pl. 41, fig. 630, 1955 (not of Forskal).

Specimen studied: Agathi (1), 175 mm.

D. IX, 26; A. III, 25; P. ii, 15; V. I, 5. Ll. 165; Ltr. 18+75.

Head 3.5 in standard length, 4.6 in total length. Depth of body 2.0 in standard length, 2.6 in total length. Eye 4.4 in head, 2.6 in snout and about 1.5 in highly convex interorbital space. Teeth lobate and truncate, 8 on each side of upper jaw and 9 on each side of lower jaw. Pectoral as long as head, ventral shorter than pectoral. First spine of dorsal minute, subsequent spines increasing in length to the last measuring about $2\frac{1}{2}$ times eye diameter. Caudal emarginate,

lobes pointed. Colour: Blackish brown with a few pale inconspicuous streaks on cheek, dorsal edge of gill opening blackish. Caudal spine in black sheath. All fins blackish.

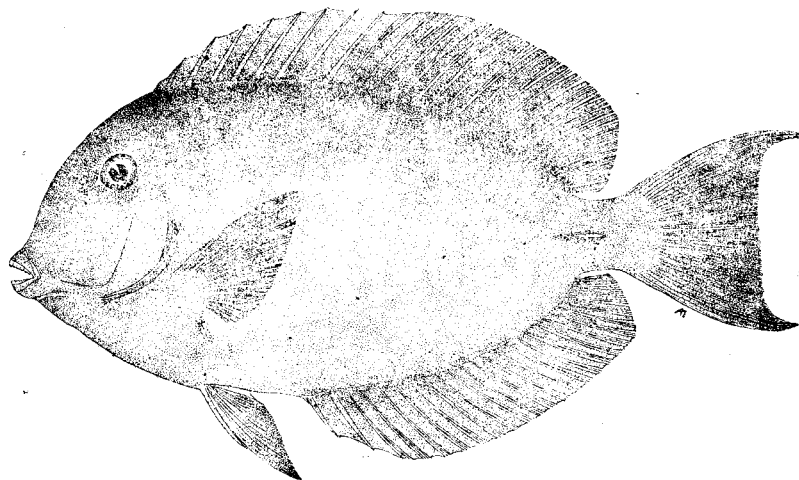


FIG. 480. *Acanthurus mata* Valenciennes, 175 mm.

Local name: *Pala* (Agathi).

Distribution: Madagascar, Seychelles, Red Sea, Laccadives, coasts of India and Ceylon, Indonesia, Philippines and Marshall Islands.

481. *Acanthurus elongatus* (Lacépède)

Chaetodon elongatus Lacépède, Hist. Nat. Poissons, 4, pp. 454 and 473, pl. 6, fig. 2, 1802. *Acanthurus elongatus* Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 391, fig. 12, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 125/406).

Acanthurus lineolatus Cuvier and Valenciennes, Hist. Nat. Poissons, 10, p. 207, 1835. Smith, Fishes of Southern Africa, p. 240, pl. 33, fig. 609, 1949. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 160, 1951. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959.

Acanthurus nigroris Smith and Smith, Fishes of Seychelles, p. 24, pl. 21, G, 1963.

Specimens studied: Agathi (5), 59 to 110 mm. Bangaram (1), 105 mm. Kadamat (2), 94 and 103 mm. Minicoy (1), 106 mm. Suheli (1), 97 mm.

D. IX, 24-25; A. III, 23-24; P. ii, 14; V. I, 5. Ll. 120-138; Ltr. 11-13 +40-44.

Head 3.3-3.6 in standard length, 4.3-4.7 in total length. Depth of body 1.9-2.1 in standard length, 2.5-2.7 in total length. Eye 3.3-3.6 in head, 1.8-2.2 in snout and 1.2-1.3 in convex interorbital space. Profile of snout rather concave. Corner of mouth nearer to hind border of preopercle than to eye. Teeth strongly lobate, 5 or 6 on each side of upper jaw and 6 or 7 on each side of lower jaw.

First dorsal spine short, spines increasing in length to the last measuring about twice eye diameter. First anal spine short, 3rd longer than 2nd and a little shorter than last dorsal spine. Pectoral longer than head, ventral as long as head. Caudal lunate, lobes pointed, the upper lobe usually longer than the lower. Colour: Variable; uniform chocolate brown to blackish, breast lighter than body, sometimes with pale greyish longitudinal lines on sides of body and pale spots on cheeks and breast. Dorsal and anal deep chocolate brown, anal generally darker, both fins narrowly edged with black. Axils and bases of posterior 2 or 3 dorsal and anal rays black. Caudal spine in black sheath. Caudal dark brown with narrow white distal edge, sometimes lower and upper border posteriorly edged with white. Pectoral pale hyaline, rays dusky, upper border dark. Ventral dark brownish, bases of soft rays generally lighter.

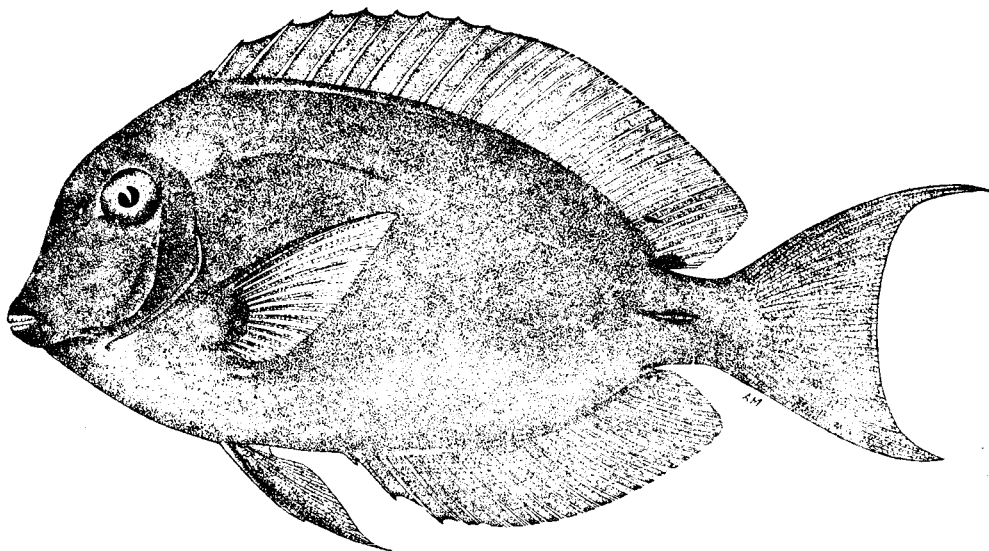


FIG. 481. *Acanthurus elongatus* (Lacépède), 106 mm. (after Jones and Kumaran)

Local names: *Kalahandi*, *Rykathi* (Minicoy). *Pala*, *Neythala* (other islands).

Distribution: East coast of Africa, Laccadives, Indonesia, Philippines and Palau, Caroline, Samoan, Society, Tuamotu and Hawaiian Islands.

482. *Naso lituratus* (Bloch and Schneider)

Acanthurus lituratus Bloch and Schneider, Syst. Ichth., p. 216, 1801.

Naso lituratus de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 183, 1951. Smith, Fishes of Southern Africa, p. 241, pl. 36, fig. 617, 1949. Munro, Fishes of Ceylon, p. 215, pl. 42, fig. 636, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/407).

Specimens studied: Agathi (4), 96 to 232 mm. Bitra (7), 95 to 205 mm. Chetlat (4), 155 to 170 mm. Minicoy (1), 155 mm.

D. VI, 28-29; A. II, 28-30; P. ii, 15; V. I, 3.

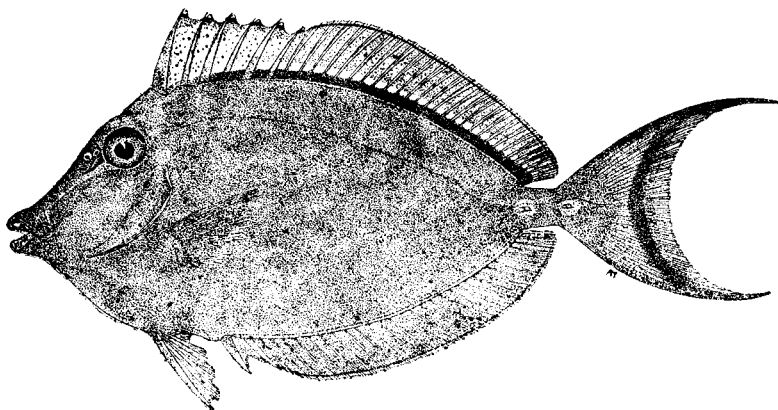


FIG. 482. *Naso lituratus* (Bloch and Schneider), 155 mm.

Head 3.2-3.4 in standard length, 4.4-5.0 in total length. Depth of body 1.9-2.2 in standard length, 2.6-3.2 in total length. Eye 3.4-3.8 in head, 2.0-2.7 in snout and 1.0-1.3 in almost flat interorbital space. Upper profile of head oblique, snout slightly concave in young, mouth slightly produced. Teeth with rounded tips, 12 to 15 on each side of upper jaw; 10 to 13 on each side of lower jaw. First dorsal spine longest, slightly longer than twice eye diameter, following spines gradually decreasing in length, last dorsal spine equal to or a little more than 1.5 eye diameter. Dorsal rays gradually decreasing in length to the last. Second anal spine longer than first, equal to or a little more than eye diameter. Pectoral more or less than length of snout, ventral shorter than pectoral. Caudal deeply lunate, lobes produced and filamentous with age. Two bony bucklers on each side of caudal peduncle, each with a broad compressed spine. Colour: Greyish brown, lips pale, breast lighter in some specimens, a yellowish band from eye to behind corner of mouth sometimes joined to another pale band along preopercle border, a yellowish area above and behind eye and caudal peduncle with two yellowish areas above caudal bucklers. Dorsal black basally, then pale yellowish to orange with narrow black subterminal line and narrow white terminal edge. Anal orange to light greyish brown with a narrow subterminal black line and narrow white terminal edge. Pectoral dark brown, membranes between rays pale posteriorly. Ventral greyish, tips dusky. Caudal brownish, rear margin broadly yellowish to orange and a submarginal black band joined to the black bands along outer margin of lobes.

Local names: *Andungeli*, *Ammas* (Minicoy). *Kankettiyar*, *Karukkan* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Ceylon, Indonesia, Philippines and Gilbert, Society, Tuamotu, Cook and Hawaiian Islands, south to Australia.

483. *Naso brachycentron* (Valenciennes)

Naseus brachycentron Cuvier and Valenciennes, Hist. Nat. Poissons, 10, p. 275, 1835.

Naso brachycentron Smith, Ichth. Bull., 32, p. 653, fig. 6, 1966. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 5, fig. 5, 1967. Jones. Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/408).

Naso rigoletto Smith, Ann. Mag. nat. Hist., (12) 4, p. 1128, fig. 1, 1951. Smith and Smith, Fishes of Seychelles, p. 25, pl. 20, E and F, 1963.

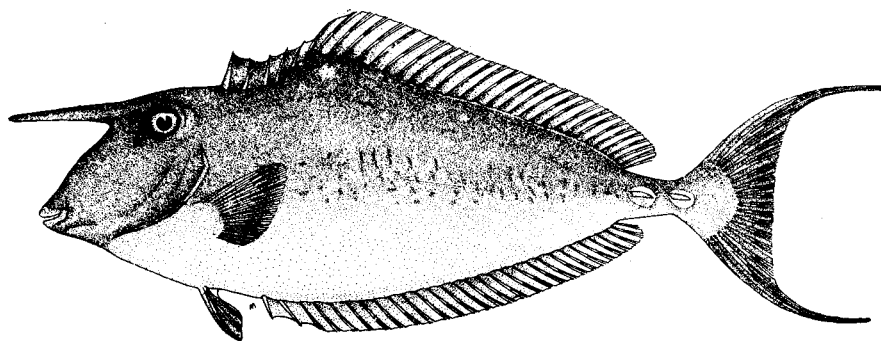


FIG. 483. *Naso brachycentron* (Valenciennes), 400 mm. (after Jones and Kumaran)

Specimen studied: Agathi (1), 400 mm.

D. V, 30; A. II, 28; P. ii, 15; V. I, 3.

Head 3.8 in standard length, 5.0 in total length. Depth of body 2.6 in standard length, 3.3 in total length. Eye 4.7 in head, 3.0 in snout and 1.2 in interorbital space. Interorbital with a median longitudinal ridge. Profile of snout oblique. Horn in front of eye long, reaching to before a vertical through tip of snout. A large hump on back beginning at the base of fourth dorsal spine, the second ray situated at the top of hump. First dorsal spine longest, 1.2 eye diameter. First three spines curved forwards at tip and the posterior two spines curved backwards at tip. Soft rays of dorsal higher than spines. Second anal spine longer than the first and equal to eye diameter; soft rays longer than spines. Caudal with filamentous lobes. Pectoral as long as snout; ventral slightly shorter than pectoral. Two caudal plates, each a knife like keel. Colour: Dark grey above, lighter below; a few irregular dark spots on middle of sides. Dorsal and caudal dusky grey. Pectoral dark grey, lighter distally. Ventral pale.

Local name: *Komban-karukkan* (Agathi).

Distribution: East coast of Africa, Seychelles, Laccadives, Indonesia, Philippines, Japan and Society Islands.

484. *Naso unicornis* (Forsk.)

Chaetodon unicornis Forsk., Descript. Animal., p. 63, 1775.

Naso unicornis Smith, Fishes of Southern Africa, p. 241, pl. 34, fig. 616, 1949. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 173, fig. 29, 1951 (in part). Munro, Fishes of Ceylon, p. 214, pl. 42, fig. 637, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 48, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/409).

Naseus unicornis Day, Fishes of India, p. 209, 1878.

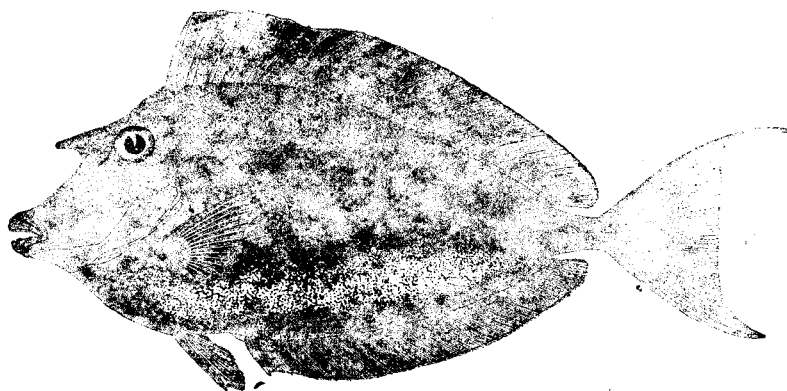


FIG. 484. *Naso unicornis* (Forsk.), 248 mm.

Specimens studied: Agathi (3), 142 to 220 mm. Bangaram (1), 248 mm. Kavarathi (1), 55 mm. Minicoy (4), 78 to 205 mm.

D. VI, 28-30; A. II, 27-29; P. ii, 15; V. I, 3.

Head 3.3-3.5 in standard length, 4.4-4.6 in total length. Depth of body 2.0-2.4 in standard length, 2.6-3.2 in total length. Eye 3.6-4.3 in head, 2.3-2.9 in snout and 1.2-1.4 in somewhat flat but keeled interorbital space. A horn like protuberance on forehead on a level with middle or upper edge of the eye, increasing in length with age. Teeth rather pointed, 15 to 19 on each side of upper jaw and 13 to 16 on each side of lower jaw. Two caudal plates on each side of caudal peduncle, each with a high triangular keel. First dorsal spine equal to or slightly longer than twice eye diameter, 6th spine slightly shorter than first. First and 2nd anal spines subequal, slightly longer than eye diameter. Rays of dorsal and anal gradually decreasing in length posteriorly. Pectoral as long as snout; ventral shorter, equal to half length of head. Caudal lunate, lobes produced into filaments with age. Colour: Uniform grey brown becoming lighter and tinged with yellow on abdomen. Caudal bucklers surrounded by

dark areas. Dorsal pale to light brownish with indistinct dark spots basally and dark outer edge. Anal similar to dorsal with 2 indistinct dark longitudinal bands and dark outer edge. Ventral pale with dusky tips. Pectoral dusky grey becoming pale posteriorly. Caudal dusky at base, pale yellowish distally.

Local names: *Niggam-mas*, *Ammas* (Minicoy). *Karukkan*, *Komban-karukkan* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Philippines, Japan and Samoan, Society and Hawaiian Islands and Australia.

485. *Naso brevirostris* (Valenciennes)

Naseus brevirostris Cuvier and Valenciennes, Hist. Nat. Poissons, **10**, p. 277, 1835. Day, Fishes of India, p. 209, pl. 48, fig. 4, 1878.

Naso brevirostris Smith, Fishes of Southern Africa, p. 241, pl. 34, fig. 615, 1949. de Beaufort, Fishes of the Indo-Australian Archipelago, **9**, p. 175, 1951. Munro, Fishes of Ceylon, p. 216, pl. 42, fig. 639, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/410).

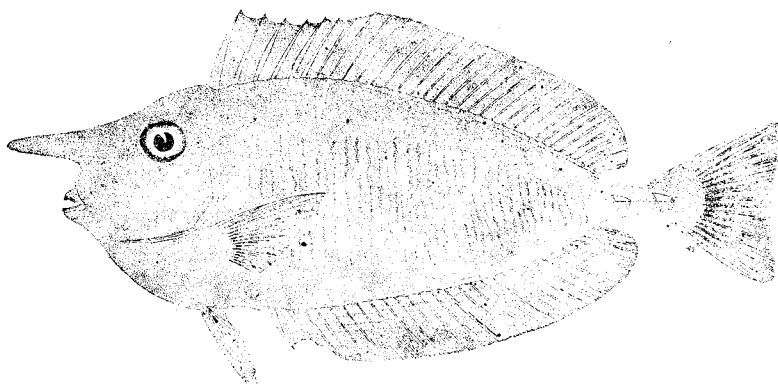


FIG. 485. *Naso brevirostris* (Valenciennes), 122 mm.

Specimens studied: Agathi (3), 72 to 75 mm. Bangaram (2), 122 and 123 mm. Bitra (1), 160 mm. Minicoy (15), 114 to 240 mm.

D. VI, 28-29; A. II, 28-29 (30); P. ii, 14; V. I, 3.

Head 3.7-3.9 in standard length, 4.6-4.7 in total length. Depth of body 2.3-2.6 in standard length, 2.7-3.2 in total length. Eye 3.3-3.7 in head, 1.8-2.0 in snout and 1.2-1.3 in slightly convex and somewhat keeled interorbital space. Frontal horn long, horizontal and in level with the middle of eye. Profile of snout below horn almost vertical. 18 to 22 pointed teeth on each side of both jaws. First dorsal spine about equal to twice eye diameter, subsequent spines decreasing in length gradually. Second anal spine slightly longer than first, a

little more than eye diameter. Pectoral $\frac{1}{2}$ eye diameter longer than snout, ventral $\frac{1}{2}$ length of head. Caudal truncate to slightly emarginate. Caudal peduncle with two bucklers on either side, each with a large triangular blade like projection. Colour: Grey brown, lighter below, occasionally with indistinct dark vertical bands on back and sides and spots on abdomen. Dorsal and anal brownish; in small specimens with 2 dark longitudinal bands. Caudal brownish, posterior half to one third pale yellowish. Pectoral brownish, margin of fin pale. Ventral pale to brownish.

Local names: *Thumbi*, *Ammas* (Minicoy). *Karukkan*, *Mudiyan* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Philippines and Ryukyu, Kingmill, Samcan, Society, Tuamotu and Hawaiian Islands.

486. *Naso tuberosus* Lacépède

Naso tuberosus Lacépède, Hist. Nat. Poissons, 3, p. 111, pl. 7, fig. 3, 1802. Munro, Fishes of Ceylon, p. 215, pl. 42, fig. 635, 1955. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 180, 1951. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/411).

Cyphomycter tuberosus Smith and Smith, Fishes of Seychelles, p. 25, pl. 20, G, 1963.

Naseus tuberosus Day, Fishes of India, p. 208, 1878.

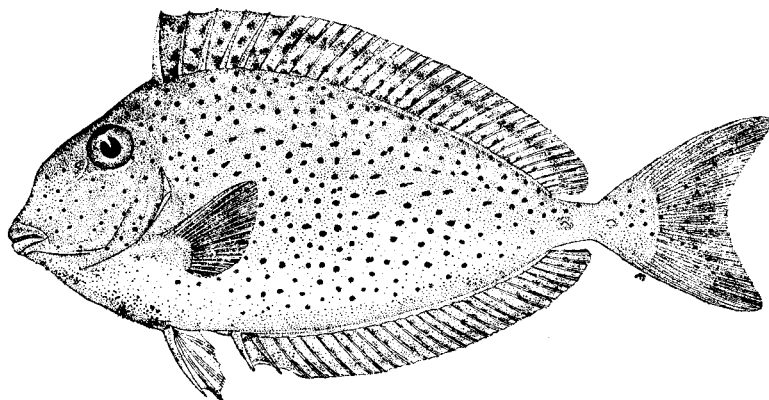


FIG. 486. *Naso tuberosus* Lacépède, 162 mm.

Specimens studied: Agathi (1), 210 mm. Bitra (2), 231 and 235 mm. Kavarathi (1), 162 mm.

D. V, 29; A. II, 26; P. ii, 16; V. I, 3.

Head 3.6-3.7 in standard length, 4.6-4.7 in total length. Depth of body 2.2-2.3 in standard length, 2.8-2.9 in total length. Eye 3.5-3.7 in head, 2.0-2.3

in snout and 1.2 in interorbital space. A hump on forehead. 15 or 16 pointed and minutely serrated teeth on each side of both jaws. First spine of dorsal slightly longer than 1.5 eye diameter, subsequent spines showing gradual decrease in length. Second anal spine longer than first, equal to eye diameter. Rays of dorsal and anal gradually decreasing in length posteriorly. Caudal peduncle with 2 bony bucklers, each with a broad compressed spine. Pectoral slightly longer than snout, ventral shorter than pectoral. Caudal emarginate. Colour: Grey with brownish tinge on back becoming lighter below; head, back and sides with small blackish spots. Dorsal and anal pale brownish with broad white margin and two rows of blackish spots, the upper row of spots on dorsal more or less forming a band. Pectoral pale brownish, distal margin broadly whitish. Ventral pale, tip slightly dusky. Caudal brownish with white outer margin and scattered blackish spots.

Local names: *Mudiyan*, *Fullikkarukkan* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Ryukyu, Caroline, Gilbert and Tonga Islands and Australia.

487. *Naso vlamingi* (Valenciennes)

Naseus vlamingii Cuvier and Valenciennes, Hist. Nat. Poissons, 10, p. 293, 1835.

Naso vlamingi de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 178, 1951.
Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 125/412).

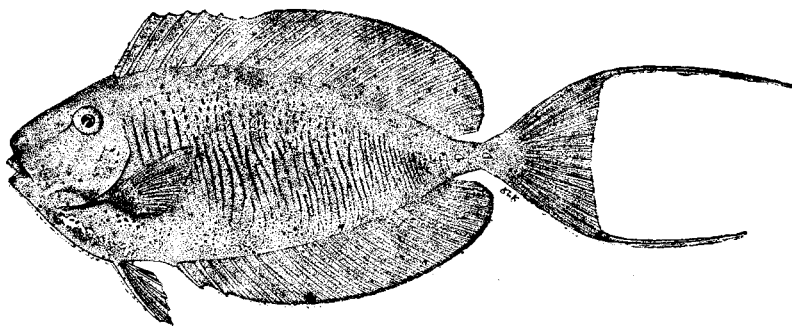


FIG. 487. *Naso vlamingi* (Valenciennes), 360 mm.

Specimens studied: Agathi (1), 190 mm. Bitra (1), 360 mm. Minicoy (1) 275 mm.

D. VI, 27; A. II, 28; P. ii, 14-15; V. I, 3.

Head 3.7-4.2 in standard length, 5.0-6.2 in total length. Depth of body 2.30-2.55 in standard length, 3.0-3.8 in total length. Eye 3.8-4.3 in head, 2.2-2.7 in snout and 1.2-1.4 in convexly elevated interorbital space. Snout with convex

hump, rounded portion almost extending to vertical through tip of upper jaw. First dorsal spine 2.0-2.7 eye diameter; anterior rays much longer than spines; last rays slightly shorter. Second anal spine slightly longer than the first, 1.3-1.6 eye diameter; anal rays longer than spines, but shorter than those of dorsal. Pectoral 1.0-1.2 eye diameter shorter than head. Ventral slightly shorter than pectoral. Caudal truncate with produced filamentous lobes in adults. Colour: Bluish brown with numerous bluish black vertical stripes on sides; cheeks, back and lower parts of trunk and tail with scattered bluish black spots; a dark bluish black stripe forward from lower border of eye. Dorsal and anal violet brown with darker edges. Caudal violet brown. Pectoral dusky brown.

Local names: *Ammas* (Minicoy). *Karukkan* (other islands).

Distribution: East coast of Africa, Laccadives, Indonesia, Philippines, Taiwan and Marshall, New Hebrides, Society, Tuamotu, Fanning and Hawaiian Islands.

Suborder TRICHIUROIDEI

Maxilla fixed to non-protractile premaxilla. Scales minute or absent. Teeth in jaws strong, compressed, some canines. Bases of caudal fin rays not overlapping the hypural bone. Pectoral fin low. Lateral line single or double. Gill membranes free from isthmus. Sometimes isolated finlets present behind dorsal and anal fins.

Oblong compressed body; spinous and soft parts of dorsal fin separated by a deep notch; sometimes detached finlets behind dorsal and anal

..... GEMPYLIDAE
Body very elongate, compressed and band-like; only one dorsal fin and no
finlets LEPIDOPIDAE

Family GEMPYLIDAE

Body elongate and compressed. Lower jaw usually projecting beyond the upper. Mouth large; teeth large, compressed, in a single series in jaws; canines present anteriorly in jaws. Detached finlets often present behind dorsal and anal fins. Lateral line feeble, single or double. Ventrals very small. Gill membranes free.

1. Body very elongate, depth of body about 16 in standard length. 28 or more spines in first dorsal *Gempylus serpens*
Moderately elongate, depth of body less than 6 in standard length. Not more than 18 spines in first dorsal 2
2. 13 to 15 dorsal spines *Ruvettus pretiosus*
18 dorsal spines 3
3. 5 or 6 dorsal finlets *Thyrstitoides marleyi*
2 dorsal finlets *Promethichthys prometheus*

488. *Gempylus serpens* Cuvier

Gempylus serpens Cuvier, Regne Animal., ed. 2, 2, p. 200, 1829. Smith, Fishes of Southern Africa, p. 311, fig. 864, 1949. de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 198, fig. 32, 1951. Jones, J. Mar. biol. Ass. India, 2, p. 85, pl. 1, figs. 1 and 2, 1960. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 127/413).



FIG. 488. *Gempylus serpens* Cuvier, 580 mm.

Specimens studied: Laccadives Sea, 10° 39' N, 72° 42' E (2), 434 and 580 mm.

D₁. XXVIII; D₂. 13+6; A. 11+7; P. 14; V. I, 4. GR. 1+1+4-5.

Body very much elongate and compressed. Dorsal profile almost straight from tip of snout to origin of second dorsal and sloping gradually to base of caudal. Ventral profile sloping gradually from origin of anal towards base of caudal. Head 5.15-5.70, depth of body 15.4-16.1, width of body 28-29, first predorsal distance 5.85-6.10, second predorsal distance 1.3, first dorsal spine 23.2-29.0, length of pectoral 9.4-10.3, ventral fin 62-72, all in standard length. Snout 2.1-2.2, eye 6.1-6.3, interorbital space 6.8, pectoral 1.84-2.02 and length of pelvic 12.1-14.1, all in head length. Height of caudal peduncle 1.2-1.6 in its length. Mouth large, lower jaw projecting beyond the upper. Maxilla extending almost to below front border of iris. Teeth large, compressed, in a single series on sides of jaws, those posteriorly increasingly larger; a pair of large compressed canines anteriorly on each side in front of upper jaw and a similar symphyseal canine. No teeth on palate. Second dorsal and anal falcate. Lateral line commencing above upper angle of opercle, gently curving down above base of pectoral and running midlateral and ending at base of caudal. Anal origin slightly behind a vertical from that of dorsal. Caudal deeply forked. Colour: Sooty black on back becoming dusky grey below. Pectoral, caudal and inter-spinous membrane of first dorsal dark greyish.

Local name: *Balam* (other islands).

Distribution: Circumtropical. Recorded from East London, South Africa and Laccadives Sea in the Indian Ocean.

489. *Ruvettus pretiosus* Cocco

Ruvettus pretiosus Cocco, Giorn. Sc. Sicilia, 42, p. 2, 1833. Goode and Bean, Oceanic Ichthyology, p. 1895. Smith, Fishes of Southern Africa, p. 309, fig. 861, 1949.

D₁. XIII-XV; D₂. 16-18+2; A. 16-18+2; P. ii, 11; V. I, 5.

Head 3.8-4.2 in standard length, 4.5-4.8 in total length. Depth of body 5.0-5.2 in standard length, 6.0-6.3 in total length. Eye 4.7-5.0 in head and 1.6-1.7 in snout. Lower jaw slightly prominent, maxillary reaching to below hind border of eye. Teeth strong, those in front canines. Minute scales and tubercles in skin; lateral line almost obsolete. Anterior dorsal spines as long as diameter of eye, posterior spines shorter. Second dorsal and anal falcate anteriorly, the longest rays slightly shorter than snout and eye. Pectoral longer than snout and half eye; ventral shorter than snout. Colour: Pinkish brown; fins slightly darker.

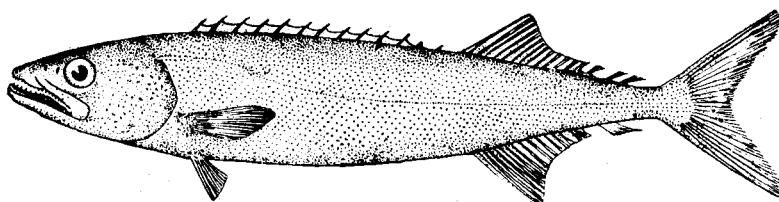


FIG. 489. *Ruvettus pretiosus* Cocco. (after Goode and Bean)

Distribution: Warm waters of the Atlantic, Mediterranean, east coast of Africa and the Laccadives.

Note: Two specimens from the Laccadives present in the museum of the Fisheries Department at Kavarathi Island were examined by us.

490. *Thyrsitoides marleyi* Fowler

Thyrsitoides marleyi Fowler, Annals Natal Mus., 6 (2), p. 245, 1929. Smith, Fishes of Southern Africa, p. 311, fig. 866, 1949.

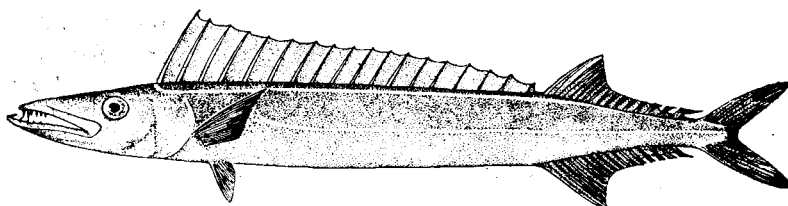


FIG. 490. *Thyrsitoides marleyi* Fowler. (after Smith)

D₁. XVIII; D₂. 15+5; A. 13+5; V. I, 5.

Head 3.8 in standard length, 4.4 in total length. Depth of body 8.0 in standard length, 9.2 in total length. Eye 6.8 in head and 3.0 in snout. Lower

jaw very prominent, maxillary reaching to below front border of eye. Teeth strong, canines in front. Scales minute. Two lateral lines, the lower originating from upper below the fifth dorsal spine. First dorsal spine longest, slightly shorter than eye; the spines decreasing in length posteriorly. Pectoral equal to snout; ventral shorter. Colour: Uniform dark brown.

Distribution: East coast of Africa and Laccadives.

491. *Promethichthys prometheus* (Cuvier)

Gempylus prometheus Cuvier, in Cuvier and Valenciennes, Hist. Nat. Poissons, 8, p. 213, pl. 222, 1831.

Thyrsites prometheus Günther, Cat. Fishes British Mus., 2, p. 351, 1860.

Promethichthys prometheus Goode and Bean, Oceanic Ichthyology, p. 200, 1895. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 194, fig. 1e, 1970.

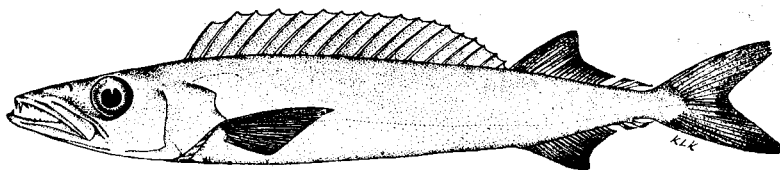


FIG. 491. *Promethichthys prometheus* (Cuvier), 415 mm. (after Jones and Kumaran)

Specimen studied: Off Kavarathi (1), 415 mm.

D₁. XVIII; D₂. II, 18 + 2; A. II, 16 + 2; P. 14.

Head 3.1 in standard length, 3.7 in total length. Depth of body 5.8 in standard length, 6.9 in total length. Eye about 5.0 in head, 1.7 in snout and 1.1 in slightly concave interorbital space. Lower jaw prominent, maxillary reaching to a point midway between anterior border of eye and the pupil. A single row of fang like teeth in upper jaw, four teeth in front much larger and two smaller teeth in between the second pair. Lower jaw with a single row of similar teeth, two front teeth larger. Palatines with a single row of small, sharp teeth. Anterior nostril slightly behind the midpoint between tip of snout and front border of eye; hind nostril closer to anterior nostril than to front border of eye. Origin of first dorsal slightly behind a vertical from hind border of preopercle; first two dorsal spines shorter than sixth or seventh, it being 1.3 eye diameter. Second dorsal as high as longest spine of first dorsal; anal similar. Two isolated finlets behind soft dorsal and anal. Pectoral slightly longer than half of head. Ventral reduced to an inconspicuous spine, slightly in advance of the pectoral. Scales small, deciduous. Lateral line single, descending obliquely below 4th or 5th dorsal spine to a little ventral to the midline of body and ending on caudal. Colour: Bluish brown, head darker. Spinous dorsal hyaline with dark

outer portion especially in front. Soft dorsal, anal and caudal brownish, darker distally.

Distribution: Circumtropical; in rather deep water. St. Helena, Canary Islands, New Holland, Madeira, Cuba, Bermuda, Leyte, Cook Island, Tahiti, Gilbert, Hawaiian, Papua, Launghlan Islands and off Kavarathi in the Laccadives.

Family LEPIDOPIDAE

Body elongate, compressed, band-like. No scales. Mouth large with strong teeth in jaws, the anterior ones fang-like. Dorsal and anal fins long. Caudal fin small. Ventrals minute or absent.

492. *Benthodesmus tenuis* Günther

Lepidopus tenuis Günther, Ann. Mag. Nat. Hist., 4 (20), p. 437, 1877. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 188, fig. 30, 1951.

Benthodesmus tenuis Smith, Fishes of Southern Africa, p. 312, fig. 868, 1949. Tholasilingam, Venkataraman and Krishna Kartha, J. Mar. biol. Ass. India, 6 (2), p. 281, fig. 11, 1965.

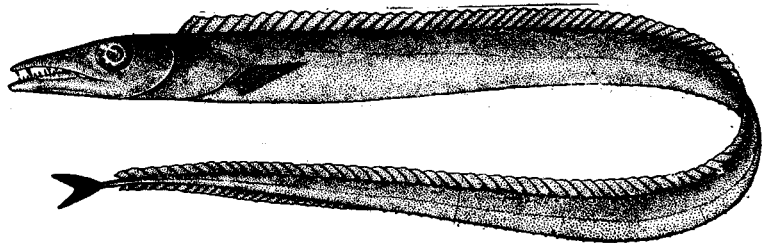


FIG. 492. *Benthodesmus tenuis* Günther, 490 mm.

Specimen studied: Kavarathi (1), 490 mm.

D. 108; A. 70; P. 12.

Body very elongate, compressed. Head 6.5 in standard length, 6.65 in total length. Depth of body 22.0 in standard length, 22.4 in total length. Eye 5.5 in head, 2.2 in snout and 0.6 in somewhat flat interorbital space. Lower jaw prominent. Cleft of mouth wide, maxillary reaching almost to below front border of eye. A single row of large pointed teeth in each jaw; a pair anteriorly on each side of upper jaw enlarged. A row of very small teeth on palatines. Two ridges between interorbital space converging posteriorly forming an acute prominence. Origin of dorsal slightly behind a level from the hind border of preopercle. Anterior anal rays hidden below the skin. Origin of anal nearer to tip of snout than to base of caudal. Pectoral as long as snout and half eye together. Ventrals absent. Colour: Uniform brownish grey.

Distribution: Between Kei Islands, off Japan, between Sandwich Islands and Tahiti, off Natal and off Kavarathi in the Laccadives and off south-west coast of India.

Suborder *SCOMBROIDEI*

Maxilla fixed to non-protractile premaxilla. Caudal fin rays overlapping the hypural bone. Lateral line simple or branched, often terminating on caudal peduncle in lateral keels. Gill membranes free from isthmus. Two dorsal fins, first spinous; second dorsal and anal fins often followed by finlets. Scales small or minute and embedded.

1. Snout not produced into a spear; body fusiform and moderately compressed *SCOMBRIDAE*
 Snout produced into a stiff sword or a spear; body elongate-oblong and strongly compressed 2
2. Ventrals very elongate; spear somewhat round in cross section *ISTIOPHORIDAE*
 Ventrals absent; spear broadly flattened and elliptical in cross section *XIPHIIDAE*

Family *SCOMBRIDAE*

Body elongate and fusiform. Mouth large; Teeth in jaws small or sometimes large and triangular, sometimes absent. Vomer and palatines with teeth. Two dorsal fins and a few finlets behind. Anal finlets present posterior to anal fin, it being similar to dorsal. Caudal fin deeply forked. Caudal peduncle sometimes with a median keel on either side and two smaller lateral keels.

1. First dorsal fin with XXV-XXVII spines. Gill rakers absent; gill lamellae reticulated. Lateral line with a deep inflection below middle dorsal spines *Acanthocybium solandri*
 First dorsal with X-XVI spines. Gill rakers present 2
2. Two lateral lines, the lower commencing from the lateral line on upper part of body below anterior part of first dorsal and deeply decurved following the lower contour of body and joining the upper lateral line near caudal peduncle *Grammatorcynus bicarinatus*
 Only one lateral line 3
3. Dorsal fins widely separated by distance exceeding depth of base of first dorsal. X-XI dorsal spines 4
 Dorsal fins separated only by a narrow interspace not exceeding eye diameter. XII-XVI dorsal spines 5

4. Corselet abruptly tapering below end of first dorsal and continuing as a very narrow band with not more than 4 or 5 rows of scales below origin of second dorsal. Total gill rakers 39 to 42 *Auxis thazard*
 Corselet gradually tapering behind first dorsal with 7 to 12 rows of scales below second dorsal finlet. Total gill rakers 40 to 47 *Auxis rochei*
5. Maxilla extending behind vertical through eye. Teeth large, curved forwards, those behind increasingly large *Gymnosarda unicolor*
 Maxilla not reaching behind middle of eye. Teeth small, conical, not curved forwards 6
6. Body completely scaled; those of corselet and lateral line larger 7
 Body naked excepting corselet and lateral line 8
7. Origin of second dorsal nearer to posterior end of caudal keel than to hind margin of eye. 18 or 19 gill rakers on lower limb. Pectoral equal to or longer than head; distance from tip of pectoral fin to end of caudal keel greater than head length *Thunnus obesus*
 Origin of second dorsal nearer to hind margin of eye than to end of caudal keel. 20 or 21 gill rakers on lower limb. Pectoral extending behind vertical through origin of second dorsal *Thunnus albacares*
8. Four to six longitudinal dark bands on lower half of body. No palatine teeth. GR. 14-17 + 34-39 *Katsuwonus pelamis*
 Generally with two to five dark blotches behind corselet between pectoral and ventral. Palatine teeth present. GR. 8-10 + 22-25.
 *Euthynnus affinis*

493. *Acanthocybium solandri* (Cuvier)

Cybium solandri Cuvier, in Cuvier and Valenciennes, Hist. Nat. Poissons, 8, p. 192, 1831.

Acanthocybium solandri Smith, Fishes of Southern Africa, p. 301, pl. 64, fig. 843, 1949.

de Beaufort, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 228, 1951. Munro, Fishes of Ceylon, p. 220, pl. 43, fig. 649, 1955. Jones and Silas, Indian J. Fish, 8, p. 192, fig. 1, 1961. Jones and Silas, Symposium on Scombroid Fishes, p. 63, pl. 4, fig. A, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 128/463).

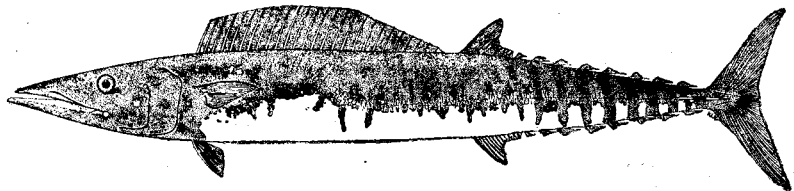


FIG. 493. *Acanthocybium solandri* (Cuvier), 800 mm.

Specimens studied: Agathi (4), 670 to 865 mm. Kavarathi (1), 720 mm. Minicoy (3), 640 to 850 mm.

D₁. XXV-XXVII; D₂. III, 9-10+9-10; A. III, 9-10+8-9; P. ii, 21; V. I, 5.

Body elongate, more or less compressed. Head 4.0-4.4 in standard length, 4.4-4.8 in total length. Depth of body 6.4-7.4 in standard length, 6.9-8.0 in total length. Eye 8.0-9.3 in head and 4.0-4.7 in produced snout. Lower jaw projecting beyond the upper. Teeth in jaws triangular, compressed, in a single series. Narrow bands of villiform teeth on vomer and palatines. Anterior two-thirds to three-fourths of first dorsal uniformly high; longest spine slightly shorter than postorbital length of head. Pectoral as long as postorbital length of head. Anal origin slightly behind that of second dorsal. Insertion of second dorsal midway between base of pectoral and base of caudal. Lateral line decurving to the mid-lateral part of body below the middle of first dorsal. Short lateral branches at right angles all along the lateral line. Gill rakers absent; gill lamellae reticulated. Colour: Bluish dark on back, silvery grey below with several dark cross bars on sides. Spinous dorsal bluish; soft dorsal and dorsal finlets dusky grey; pectoral, anal and anal finlets grey.

Local names: *Digu-mas* (Minicoy). *Ayakkura* (other islands).

Distribution: Tropical and temperate waters of the Atlantic, Indian and Pacific Oceans.

494. *Grammatorcynus bicarinatus* (Quoy and Gaimard)

Thynnus bicarinatus Quoy and Gaimard, Voy. *Uranie*, et Physicienne, Poissons, p. 357, pl. 61, fig. 1, 1825.

Grammatorcynus bicarinatus de Beaufort, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 215, fig. 37, 1951. Jones and Silas, Symposium on Scombroid Fishes, p. 16, pl. 4, fig. C, (1962) 1964, Jones and Silas, FAO Fish. Rep., 6, 2, pp. 811-833, figs. 7 A and B, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 128/414).

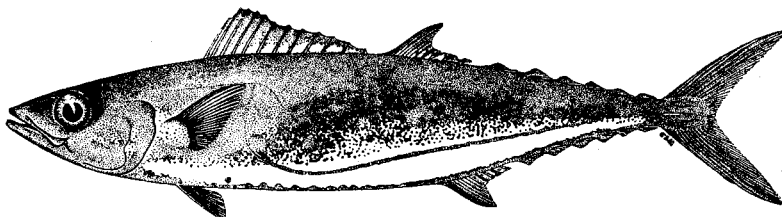


FIG. 494. *Grammatorcynus bicarinatus* (Quoy and Gaimard), 400 mm.

Specimens studied: Agathi (2), 400 and 430 mm.

D₁. XII; D₂. 11+7; A. 12+6; P. 24; V. I, 5. GR. 3+1+15.

Body elongate, compressed. Head 4.4-4.5 in standard length, 5.2-5.3 in total length. Depth of body 4.6-4.7 in standard length, 5.6-5.7 in total length. Eye 4.2-4.3 in head, 1.3 in pointed snout and also in interorbital space. Jaws with a single row of pointed teeth; a rounded patch of teeth on vomer and in an elongate patch on palatines. Second spine of first dorsal longest, slightly shorter than postorbital length of head. Height of second dorsal as long as postorbital length of head. Height of anal less than that of second dorsal. Two lateral lines, the upper ending below sixth dorsal finlet; the second originating from the first above end of pectoral running downwards and then curving backwards and joining the upper in front of peduncular keel and ending on peduncular keel. Colour: Brownish blue above, lighter below. Fins greyish, dusky at tip.

Distribution: Red Sea, Laccadives, Andamans, Indonesia, Philippines, Ryukyu, Japan, Marshall Islands, Australia and Hawaiian Islands.

495. *Auxis thazard* (Lacépède)

Scomber thazard Lacépède, Hist. Nat. Poissons, 3, p. 9, 1802.

Auxis thazard Jones, Indian J. Fish., 5, p. 190, fig. 1, 1958. Jones and Silas, Indian J. Fish., 7, p. 377, fig. 4, 1960. Jones and Silas, Symposium on Scombroid Fishes, p. 20, pl. 2, figs. B and C, (1962) 1964. Jones and Silas, FAO Fish. Rep., 6, 3, p. 1783, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 128/415).

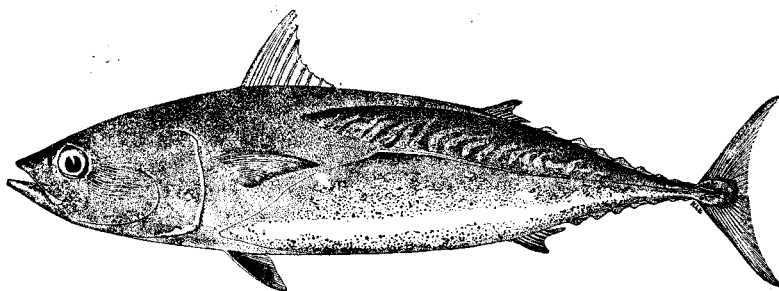


FIG. 495. *Auxis thazard* (Lacépède), 350 mm.

Specimens studied: Minicoy (9), 240 to 380 mm.

D₁. X-XI; D₂. 12-13+8; A. 13+7; P. 23-24; V. I, 5. GR. 9-10+29-32.

Head 3.4-3.7 in standard length, 3.7-4.1 in total length. Depth of body 4.0-4.3 in standard length, 4.4-4.8 in total length. Eye 5.6-6.8 in head, 1.3-1.6 in snout and 1.5-1.6 in interorbital space. Maxillary reaching to below anterior 2/5 of eye. Minute teeth in jaws. Vomer and palatines edentulous. First dorsal spine as long as half length of head. First dorsal and second dorsal separated by interspace equal to head without snout. Ventral as long as snout and eye together.

Emargination of corselet above lateral line extending well before a level from tip of pectoral and tapering immediately below end of first dorsal and continued as a very narrow band of 4 or 5 rows of scales in a line below second dorsal origin. Colour: Dark bluish above, silvery below. Naked area above lateral line with grey oblique bands. Spinous dorsal grey; soft dorsal and finlets dusky grey; pectoral dusky grey; ventral, anal and anal finlets grey to dusky grey.

Local name: *Ragondi* (Minicoy).

Distribution: Tropical and temperate waters of the Indian and Pacific Oceans.

496. *Auxis rochei* (Risso)

Scomber rochei Risso, Ichth. Nice, p. 165, 1810.

Auxis tapeinosoma Jones, Indian J. Fish., 5, p. 192, fig. 2, 1958.

Auxis thynnoides Bleeker, Nat. Tijds. Ned.-Ind., 8, p. 301, 1855. Jones and Silas, Indian J. Fish., 7, p. 378, fig. 3, 1960. Jones and Silas, Symposium on Scombroid Fishes, p. 23, pl. 2, fig. A, (1962) 1964. Jones and Silas, FAO Fish. Rep., 6, 3, p. 1786, 1963. Jones, *Ibid.*, 6, 2, pp. 782-810, fig. 1, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 128/416).

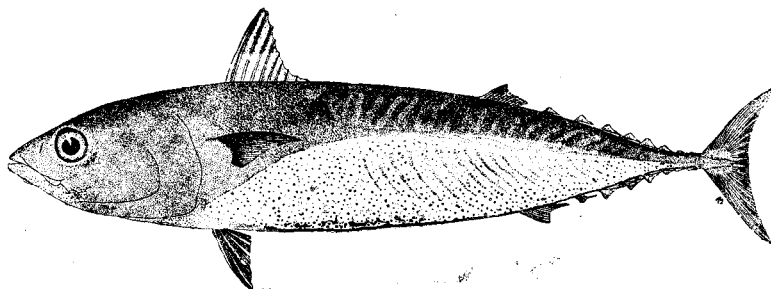


FIG. 496. *Auxis rochei* (Risso), 250 mm.

Specimens studied: Minicoy (9), 220 to 275 mm.

D₁. X-XI; D₂. 13+8; A. 13+7; P. 24-25; V. I, 5. GR. 9-11+33-36.

Head 3.7-4.0 in standard length, 4.1-4.5 in total length. Depth of body 4.6-4.9 in standard length, 5.1-5.5 in total length. Eye 5-6 in head, 1.3-1.4 in snout and also in interorbital space. Maxillary reaching to below anterior 2/5 of eye. Minute teeth in jaws. Vomer and palatines edentulous. First dorsal spine equal to or longer than snout and eye. Spinous dorsal and soft dorsal separated by interspace about one eye diameter shorter than head. Height of second dorsal and anal about equal to eye diameter. Pectoral as long as half length of head. Ventral slightly shorter than snout and eye. Body naked except for corselet running from base of second dorsal to above end of pectoral and gradually tapering towards tail with a rounded curve forming a comparatively wide band of 8 to 11

rows of scales at vertical through second dorsal and then forwards to above base of ventral, curving back and ending behind tip of ventrals. Colour: Bluish dark above, silvery white below. Wavy bands in naked area above lateral line. A dark patch at the postero-ventral border of eye. Spinous dorsal pale with darker edges; second dorsal and dorsal finlets slightly brownish; anal fin and finlets pale; pectoral pale, upper rays darker; ventral pale, whitish distally.

Local name: *Ragondi* (Minicoy).

Distribution: Warm waters of the Indian, Pacific and Atlantic Oceans.

497. *Gymnosarda unicolor* (Rüppell)

Thynnus (*Pelamys*) *unicolour* Rüppell, Neue Wirbelt. Fische Rothen Meeres, p. 40, pl. 12, fig. 1, 1835.

Gymnosarda nuda Kishinouye, Suisan Gakkwai Ho (Proc. Sci. Fish. Ass., Tokyo), 1, p. 13, 1915.

Gymnosarda unicolor Jones and Silas, Indian J. Fish., 7, p. 380, fig. 7, 1960. Jones and Silas, Symposium on Scombroid Fishes, p. 27, pl. 4, fig. D, (1962) 1964. Jones and Silas, FAO Fish. Rep. 6, 3, p. 1787, 1963. Silas, FAO Fish. Rep., 6, 2, p. 877-899, fig. 1, 1963. Smith and Smith, Fishes of Seychelles, p. 41, pl. 31, H, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 128/417).

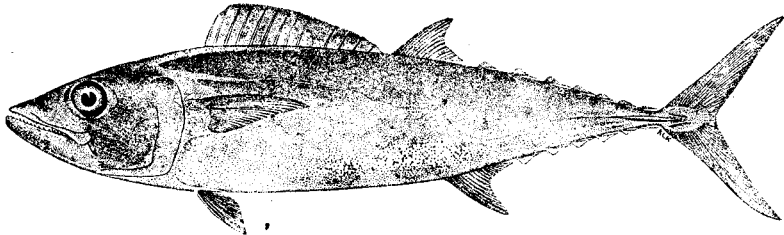


FIG. 497. *Gymnosarda unicolor* (Rüppell), 480 mm.

Specimens studied: Agathi (1), 950 mm. Kavarathi (5), 760 to 970 mm. Minicoy (4), 450 to 800 mm.

D₁. XIV; D₂. 14+7; A. 13+6; P. 27; V. I, 5.

Head 3.7-4.0 in standard length, 4.3-4.6 in total length. Depth of body 4.5-4.8 in standard length, 5.2-5.5 in total length. Eye 4.8-5.2 in head, 1.7-1.8 in snout and also in interorbital space. Lower jaw deeper and prominent. Maxillary reaching behind vertical through middle of eye. Teeth large, in a single series in jaws, curved forwards, becoming larger posteriorly. Third dorsal spine longest, slightly shorter than snout. First and second dorsal fins separated by only a narrow interspace not exceeding diameter of eye. Height of second dorsal and anal as long as snout. Pectoral longer than head without snout. Ventral equal to snout. Body appearing naked except for greatly reduced corselet and lateral

line. Corselet scales beginning below middle of spinous dorsal running forward to above operculum and curving back along lateral line. Corselet scales very narrow at the level of tip of pectoral and forwards to above base of ventral and ending behind tip of ventral. Lateral line undulating above anal fin. Caudal keels well developed. Colour: Dark bluish on back, becoming silvery white on sides and below. Spinous dorsal grey, darker distally. Soft dorsal and dorsal finlets dusky grey. Pectoral dark. Anal fin and anal finlets slightly dusky grey. Ventral grey, darker distally.

Local names: *Vori-kannali* (Minicoy). *Pallan-choora* (other islands).

Distribution: East coast of Africa, Seychelles, Red Sea, Laccadives, coasts of India, Maldives, Ceylon, Andamans, Indonesia, Philippines, Japan, Queensland, New Guinea and Marshall, Society, Ryukyu and Tahiti Islands.

498. *Thunnus obesus* (Lowe)

Thynnus obesus Lowe, Proc. Zool. Soc., p. 78, 1939.

Parathunnus obesus mebachii Jones and Silas, Indian J. Fish., 7, p. 383, fig. 10, 1960.

Thunnus mebachii Kishinouye, Suisan Gakkwai Ho (Proc. Sci. Fish. Ass., Tokyo), 1, p. 19, pl. 1, fig. 11, 1915.

Thunnus (Parathunnus) mebachii Jones, Bull. cent. mar. Fish Res. Inst., 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 128/418).

Thunnus (Parathunnus) obesus mebachii Jones and Silas, Symposium on Scombroid Fishes, p. 36, pl. 3, fig. A, (1962) 1964.

Thunnus (Parathunnus) obesus sibi Jones and Silas, FAO Fish. Rep., 6, 3, p. 1791, 1963.

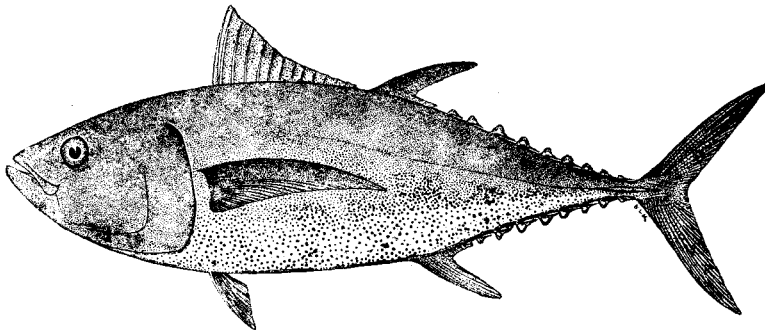


FIG. 498. *Thunnus obesus* (Lowe), 173 mm.

Specimens studied: Kavarathi (1), 570 mm. Laccadive Sea (2), 1500 and 1730 mm.

D₁. XIV-XV; D₂. 13-14+9; A. 14+8; P. 34-35; V. I, 5. GR. 7+18-19.

Head 3.4-3.7 in standard length, 3.9-4.2 in total length. Depth of body 3.4-3.8 in standard length, 3.9-4.3 in total length. Eye 5.0-6.0 in head, 1.6-1.8

in snout and 2.0-2.4 in interorbital space. Maxillary almost reaching to below middle of eye. Preoperculum more or less angular at lower posterior margin. A single series of conical teeth in jaws and in elongate patches on vomer and palatines. First dorsal spine equal to or slightly longer than snout and eye together. Soft dorsal about equal to postorbital length of head. Anal height almost equal to that of dorsal. Pectoral equal to or slightly longer than head, surpassing vertical through dorsal origin. Ventral slightly shorter than snout and eye. Caudal keel well developed. Distance between tip of pectoral and caudal keel greater than length of head. Body completely scaled. Colour: Dark to greyish blue on back becoming silvery white below. Spinous dorsal greyish. Pectoral blackish above, lower rays yellowish. Ventral grey with yellowish tinge. Anal pale, tips yellowish. Anal and dorsal finlets yellowish grey.

Local name: *Valiya-choora* (Kavarathi).

Distribution: Warm waters of the Indo-Pacific.

499. *Thunnus albacares* (Bonnaterre)

Scomber albacares Bonnaterre, *Encycl. Meth.*, p. 140, 1788.

Neothunnus macropterus Munro, *Fishes of Ceylon*, p. 219, pl. 43, fig. 647, 1955. Jones and Silas, *Indian J. Fish.*, 7, p. 385, fig. 12, 1960.

Thunnus macropterus de Beaufort, in Weber and de Beaufort, *Fishes of the Indo-Australian Archipelago*, 9, p. 223, fig. 39, 1951.

Thynnus macropterus Temminck and Schlegel, *Fauna Japonica, Pisces*, p. 98, pl. 51, 1850. Day, *Fishes of India*, p. 253, 1878.

Thunnus (Neothunnus) albacares Jones, *Bull. cent. mar. Fish. Res. Inst.*, 8, p. 26, 1969 (Cat. No. CMFRI-LA-F. 128/419).

Thunnus (Neothunnus) albacares macropterus Jones and Silas, *Symposium on Scombroid Fishes*, p. 40, pl. 3, fig. B, (1962) 1964. Jones and Silas, *FAO Fish. Rep.*, 6, 3, p. 1793, 1963.

Thunnus (Neothunnus ?) itosibi Jones and Silas, *Symposium on Scombroid Fishes*, p. 42, pl. 1, C and fig. 7, (1962) 1964. Jones and Silas, *FAO Fish. Rep.*, 6, 3, p. 1794, 1963.

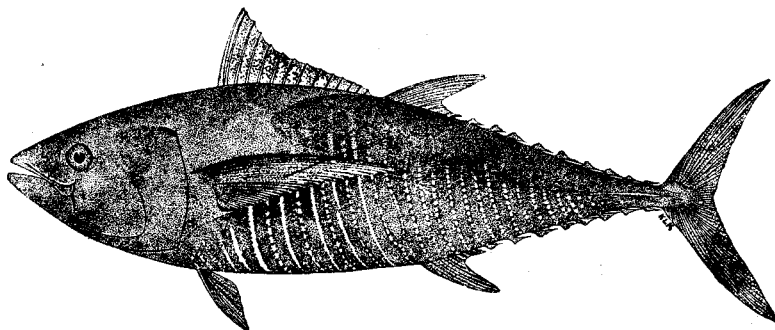


FIG. 499. *Thunnus albacares* (Bonnaterre), 720 mm.

Specimens studied: Agathi (4), 480 to 750 mm. Kalpeni (3), 650 to 820 mm. Minicoy (6), 450 to 800 mm.

D₁. XIII-XIV; D₂. 14+9; A. 14-15+8; GR. 8-9+20-21.

Head 3.4-3.7 in standard length, 3.9-4.2 in total length. Depth of body 3.5-3.8 in standard length, 4.0-4.3 in total length. Maxillary reaching to below anterior 2/5 of eye. Teeth in a single series in jaws, a patch of teeth on vomer and on palatines. Body completely scaled, those anteriorly on back and lateral line larger. First dorsal spine equal to snout and eye together. Insertion of second dorsal nearer to hind border of eye than to posterior end of caudal keel. Anal and soft dorsal as long as postorbital length of head and longer than first dorsal spine. Pectoral slightly longer than head, surpassing vertical through insertion of second dorsal. Ventral equal to snout and eye together. Colour: Back dark becoming greyish with yellowish tinge on sides and below and with several oblique transverse lines or rows of spots on sides of body. First dorsal greyish with yellowish tinge; second dorsal yellowish distally; dorsal finlets, anal and anal finlets yellow with dusky edges. Pectoral dark, yellowish distally.

Local names: *Kannali-mas* (Minicoy). *Poovan-choora* (other islands.).

Distribution: Tropical and subtropical seas. Oceanic, occasionally occurring in coastal waters.

Note: Small numbers of juveniles of the yellow-fin tuna, *Thunnus albacares* (Bonner-terre) are caught along with the skipjack tuna, *Katsuwonus pelamis* (Linnaeus) and *mas* or *katsuobushi* is prepared out of the same also (see the note on page 588). However, owing to the higher fat content in the meat, the cured product or *mas* is considered to be inferior to the *mas* prepared from skipjack tuna.

500. *Katsuwonus pelamis* (Linnaeus)

Scomber pelamis Linnaeus, Syst. Nat., ed. 10, p. 297, 1758.

Euthynnus pelamis Smith, Fishes of Southern Africa, p. 298, pl. 65, fig. 829, 1949. de Beaufort, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 217, 1951.

Katsuwonus pelamis Munro, Fishes of Ceylon, p. 219, pl. 43, fig. 645, 1955. Jones and Silas, Indian J. Fish., 7, p. 388, fig. 14, 1960. Jones and Silas, Symposium on Scombroid Fishes, p. 45, pl. 5, fig. C, (1962) 1964. Jones and Silas, FAO Fish. Rep., 6, 2, pp. 663-694, fig. 1, 1963. Jones and Silas, FAO Fish. Rep., 6, 3, p. 1796, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 128/420).

Katsuwonus pelamis Kishinouye, Suisan Gakkwai Ho (Proc. Sci. Fish. Ass., Tokyo), 1, p. 21, 1915.

Thynnus pelamis Day, Fishes of India, p. 252, 1878.

Specimens studied: Agathi (4), 280 to 490 mm. Kalpeni (3), 300 to 430 mm. Kavarathi (7), 320 to 480 mm. Minicoy (18), 260 to 580 mm.

D₁. XV-XVI; D₂. 14-15+8; A. 15+7; P. 26-27; V. I, 5. GR. 14-17+34-39.

Head 3.1-3.4 in standard length, 3.4-3.7 in total length. Depth of body 3.8-4.1 in standard length, 4.2-4.5 in total length. Eye 5.7-7.0 in head. 1.6-2.0 in snout and 1.4-1.7 in interorbital space. Maxillary extending to below anterior 2/5 of eye. Jaws with small conical teeth. Vomer and palatines edentulous. First and second dorsal fins separated only by a narrow interspace not exceeding eye diameter. First dorsal spine almost equal to postorbital length of head, following spines gradually becoming shorter. Dorsal and anal low, anterior rays longer. Anal insertion slightly behind that of dorsal. Pectoral shorter than postorbital length of head. Body except corselet and lateral line naked. Corselet well developed, scales on front part of back and above pectoral larger than others. Colour: Dark bluish above, yellowish white below. Four to six longitudinal dark bands on lower half of body. Spinous dorsal pale with dark edges. Second dorsal dusky grey. Pectoral dark, lower rays lighter. Ventral dusky grey, inner rays lighter.

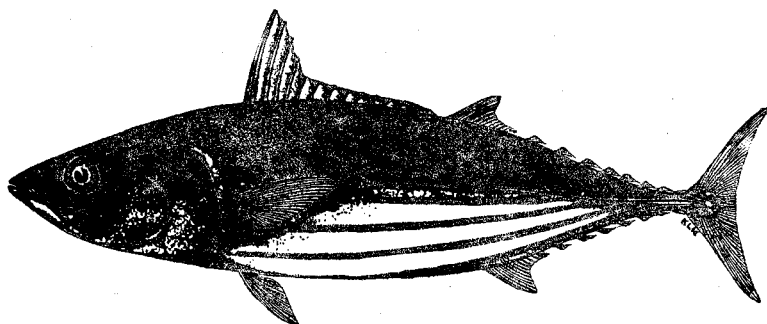


FIG. 500. *Katsuwonus pelamis* (Linnaeus), 440 mm.

Local names: *Kalibila-mas* (Minicoy). *Choora* (other islands).

Distribution: Tropical and temperate waters of the Atlantic, Indian and Pacific Oceans.

Note: The oceanic skipjack or the skipjack tuna, *Katsuwonus pelamis* (Linnaeus) constitutes the most important fishery in the Laccadives as in the Maldives. Till about a decade and a half ago, this fishery was confined only to the Minicoy Island where skipjack fishing using live-bait flourished from very ancient times (Jones and Kumaran, 1959). The success or failure of the fishery depended mainly on the degree of availability of small fishes suitable to be used as live-bait for chumming the skipjack (Jones, 1958 and 1964). A cured product known as *mas*, prepared by a complicated process of slicing the meat off the bones and boiling and smoke-drying the same for several days converting it into a very hard product over which a mold is allowed to develop finds a ready market in India and Ceylon. It is similar to the *mas* made in the Maldives and the *katsuobushi* in Japan.

501. *Euthynnus affinis* (Cantor)

Thynnus affinis Cantor, J. Asiat. Soc. Bengal, **18**, p. 1088, 1850.

Euthynnus affinis Munro, Fishes of Ceylon, p. 219, pl. 43, fig. 646, 1955.

Euthynnus affinis affinis Jones and Silas, Indian J. Fish., **7**, p. 389, fig. 15, 1960. Jones and Silas, Symposium on Scombroid Fishes, p. 50, pl. 5, fig. A, (1962) 1964. Jones and Silas, FAO Fish. Rep., **6**, **3**, p. 1795, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 27, 1969 (Cat. No. CMFRI-LA-F. 128/421).

Euthynnus alleteratus Smith, Fishes of Southern Africa, p. 298, pl. 65, fig. 830, 1949.

Euthynnus alleteratus affinis de Beaufort, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **9**, p. 218, fig. 38, 1951.

Thunnus thunnina Day, Fishes of India, p. 252, pl. 44, fig. 6, 1878 (not of Cuvier and Valenciennes).

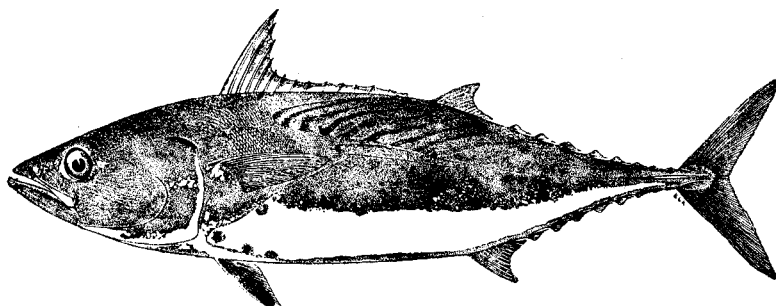


FIG. 501. *Euthynnus affinis* (Cantor), 350 mm.

Specimens studied: Minicoy (7), 320 to 460 mm. Kavarathi (3), 380 to 440 mm.

D₁. XIV-XV; D₂. 13-14+8-9; A. 13-14+7-8; P. 26-27; V. I, 5. GR. 8-10+22-25.

Head 3.4-3.7 in standard length, 3.8-4.1 in total length. Depth of body 3.8-4.2 in standard length, 4.2-4.7 in total length. Eye 5.6-6.5 in head, 1.6-1.8 in snout and 1.8-2.2 in convex interorbital space. Maxillary reaching almost to below middle of eye. Teeth curved, conical, in a single series in jaws. A single row of teeth on vomer and palatines. First dorsal spine as long as post-orbital length of head, spines becoming shorter posteriorly, the last one shorter than half eye diameter. Height of second dorsal much shorter than snout. Anal inserted opposite last ray of soft dorsal or slightly behind, its height almost equal to that of soft dorsal. Pectoral as long as postorbital length of head. Ventral equal to snout and eye. Keel on caudal peduncle moderately developed. Corselet well developed with two deep emarginations; scales above pectoral larger than those below pectoral. Colour: Dark bluish above, silvery white below; naked area above lateral line with grey oblique bands. Two to five variably indistinct to brown blotches behind corselet between pectoral and ventral. Spinous dorsal greyish with darker edges; soft dorsal, dorsal finlets, pectoral and caudal brownish; ventral, anal and anal finlets greyish to dusky.

Local names: *Latti*, *Latti-choora* (Minicoy). *Choorā* (Kavarathi).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India, Ceylon, Andamans, Malaysia, Indonesia, Japan and Philippines and Hawaiian Islands and Western Australia.

Family ISTIOPHORIDAE*

Body elongate, compressed. Mouth large. Upper jaw strongly produced and almost cylindrical. Minute villiform bands of teeth in jaws. Two fleshy keels on each side of caudal peduncle. Dorsal fin large, the posterior spines increasingly shorter or sometimes very high and sail-like. Second dorsal similar to second anal. Ventral fin with one to three rays, sometimes fused.

1. First dorsal fin high with anterior rays shorter than middle rays, much more than twice depth of body *Istiophorous platypterus*
Height of dorsal fin less than 1.5 times depth of body 2
2. Lobe of first dorsal higher than depth of body at origin of dorsal. Middle rays of first dorsal less than half height of anterior lobe of the fin *Tetrapturus audax*
Lobe of first dorsal less than depth of body 3
3. Pectoral fin rigid forming a right angle with side of body. Lateral line simple *Makaira indica*
Pectoral fin not rigid and easily folding back against the side. Lateral line complete with branchings especially anteriorly *Makaira nigricans*

502. *Istiophorus platypterus* (Shaw and Nodder)

Xiphias platypterus Shaw and Nodder, Natural Misc., 10, pl. 88, 1791.

Histiophorus gladius Day, Fishes of India, p. 198, 1878. de Beaufort, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 240, 1951. Munro, Fishes of Ceylon, p. 222, pl. 43, fig. 654, 1955.

Istiophorus gladius Smith, Fishes of Southern Africa, p. 315, pl. 67, fig. 874, 1949. Jones, J. Mar. biol. Ass. India, 1, pp. 255-256, 1959. Jones and Silas, Symposium on Scombroid Fishes, p. 66, pl. 8, fig. C, (1962) 1964. Jones, Bull. cent. mar. Res. Inst., 8, p. 27, 1969 (Cat No. CMFRI-LA-F. 132/422),

Specimens studied: Agathi (3), 1600 to 2150 mm. Minicoy (5), 1700 to 2800 mm.

D₁. XLII-XLVIII; D₂. 7; A₁. 10-12; A₂. 7; P. 17-18; V I, 2.

Body elongate, strongly compressed, the upper jaw greatly produced. Head 2.9-3.2 in standard length, 3.5-3.8 in total length. Dorsal profile of head

* The shortbill spearfish, *Tetrapturus angustirostris* Tanaka is reported to occur in the Laccadives, but we have not come across any specimens.

gradually ascending to dorsal. Rostrum about 4.5 in total length. Granulations on lower part of rostrum stronger than those on sides. Lower jaw with small teeth. Dorsal origin on nape; first dorsal remarkably high and sail-like, anterior rays markedly shorter than middle rays; posterior rays decreasing rapidly in length. Longest dorsal ray 2.0-2.5 times depth of body. First anal below posterior quarter of first dorsal; second anal opposite to second dorsal. Pectoral falciform, as long as half length of head. Ventral equal to or longer than pectoral and depressible in a groove of the abdomen. First anal lobe equal to postorbital length of head. Colour: Dark blue above, lighter below; body with vertical bands when alive. First dorsal dark with numerous black spots. Anal fins bluish grey. Pectoral bluish to dark. Ventral blackish.

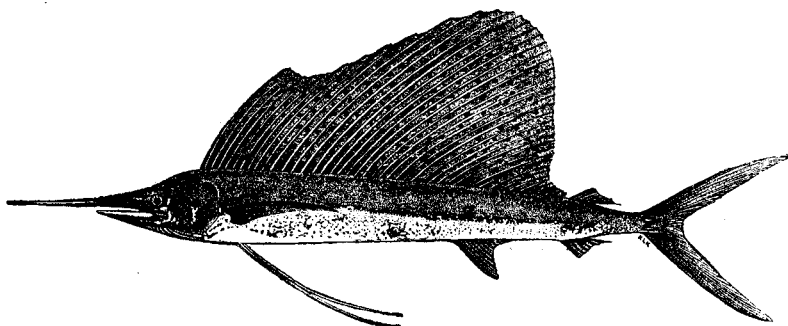


FIG. 502. *Istiophorus platypterus* (Shaw and Nodder), 170 mm.

Local names: *Fung-hibaru* (Minicoy). *Ola-meen* (Agathi).

Distribution: East coast of Africa, Seychelles, Red Sea, Laccadives, coasts of India and Ceylon, Indonesia, Indo-China, Philippines, Japan and Fiji and Hawaiian Islands.

503. *Tetrapturus audax* Philippi

Tetrapturus audax Philippi, Anales Universidad Chile, 7(1), p. 35, pl. 8, figs. 2 and 3, 1887. Jones and Silas, Symposium on Scombroid Fishes, p. 74, fig. 13, (1962) 1964.

Makaira mitsukurii Munro, Fishes of Ceylon, p. 223, pl. 43, fig. 656, 1955.

Marlina audax Smith, Ichth. Bull., 2, p. 31, pl. I, fig. G, 1956.

D₁. III, 34-40; D₂. 6-7; A₁. II, 12-13; A₂. 6-7; V. I, 2.

Head including bill 3.0-3.3, depth of body 6.7-7.5, both in total length. Snout about 1.5 in head. Premandibular length of bill almost equal to or greater than preorbital distance. Anterior lobe of first dorsal higher than depth of body at dorsal fin origin. Height of middle rays of first dorsal fin much less than half height of anterior lobe of fin. Length of pectoral fin greater than depth of body. Ventral slightly shorter than pectoral. Anal fin inserted nearer origin of upper

caudal lobe than hind margin of head. Second anal in advance of second dorsal. Colour: Deep metallic blue, ventral surface silvery white; sides of body with prominent vertical stripes. Dorsal fin blue black. Pectoral dark grey.

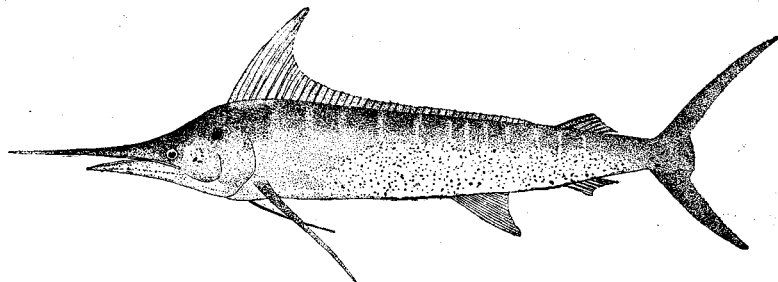


FIG. 503. *Tetrapturus audax* Philippi. (after Smith)

Distribution: Tropical and temperate waters of the Indo-Pacific. Reportedly to be relatively rare in the equatorial region of the Central and Western Pacific.

504. *Makaira indica* (Cuvier)

Tetrapturus indicus Cuvier, in Cuvier and Valenciennes, Hist. Nat. Poissons, 8, p. 286, 1831.

Makaira indica Deraniyagala, Col. Atlas. Vert. Ceylon, pl. 28, 1952. Munro, Fishes of Ceylon, p. 223, pl. 43, fig. 657, 1955. Jones and Silas, Symposium on Scombroid Fishes, p. 82, pl. 8, fig. D, (1962) 1964.

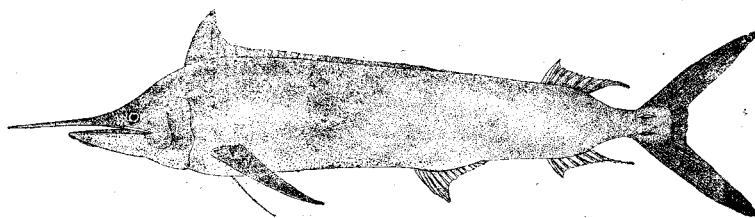


FIG. 504. *Makaira indica* (Cuvier). (after Deraniyagala)

D₁. III, 33-37; D₂. 7; A₁. II, 10-11; A₂. 7; V. I, 2.

Head including bill less than 4, depth of body about 6, both in total length. Snout 1.5 in head. Upper jaw about 2.2 times the length of lower jaw. Anterior part of first dorsal well developed but gradually becoming lower posteriorly. Pectoral shorter than depth of body. Ventral about half length of pectoral. Pectoral fin rigid forming a right angle with the side of body and cannot be folded flat against the side without breaking the joint. Anterior lobe of first dorsal low, much less than depth of body. Anal fin inserted midway between

origin of upper caudal lobe and hind margin of head or slightly more anterior. Colour: Uniform dark blue; ventral surface slightly lighter. Dorsal dark bluish. Caudal and pectoral dark purple.

Distribution: Tropical and temperate waters of the Indian and Pacific Oceans.

505. *Makaira nigricans* Lacépède

Makaira nigricans Lacépède, Hist. Nat. Poissons, 4, p. 688-91, pl. 13, fig. 3, 1803. Jones and Silas, Symposium on Scombroid Fishes, p. 85, pl. 8, fig. B, (1962) 1964.
Makaira mazara Nakamura, U.S. Fish and Wildl. Ser. Spec. Sc. Rep. Fish., 153, p. 28, pl. 14, fig. 2, 1955.

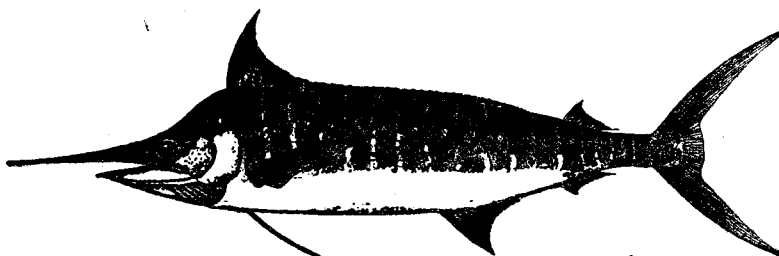


FIG. 505. *Makaira nigricans* Lacépède. (after Nakamura)

D₁. III, 37-44; D₂. 7; A₁. II, 14; A₂. 7; V. I, 2.

Head generally slightly more than 4 in total length. Snout 1.5 in head. Upper jaw more than twice length of lower jaw. Anterior lobe of first dorsal low, less than depth of body. Hind rays of first dorsal fin low. Pectoral fin not rigid and easily folding back against the side. Lateral line complicated, forming hexagonal branchings anteriorly; not easily discernible in adults. Colour: Dorsal surface of body dark purple, ventral surface brownish and the body completely with blackish tinge.

Distribution: Throughout the warmer waters of the Indian, Pacific and Atlantic Oceans.

Family XIPHIIDAE

Body elongate, scarcely compressed. Upper jaw strongly produced into a powerful depressed spear. Caudal peduncle with a large keel on either side. Ventrals absent. Scales absent in adults. Posterior spines of first dorsal lost with age and leaving the high falcate lobe. No detached finlets. Anal fin divided in adult. Pectorals moderately long, equalling height of first dorsal lobe. Teeth absent. Branchiostegals not united.

506. *Xiphias gladius* Linnaeus

Xiphias gladius Linnaeus, Syst. Nat., ed. 10, p. 248, 1758. Deraniyagala, Ceylon Jour. Sci., (B) 20, p. 351, 1937. Smith, Fishes of Southern Africa, p. 314, pl. 67, fig. 873, 1949. Munro, Fishes of Ceylon, p. 222, pl. 43, fig. 653, 1955. Jones and Silas, Symposium on Scombroid Fishes, p. 88, pl. 9, A and B and text fig. 15, (1962) 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 131/424).

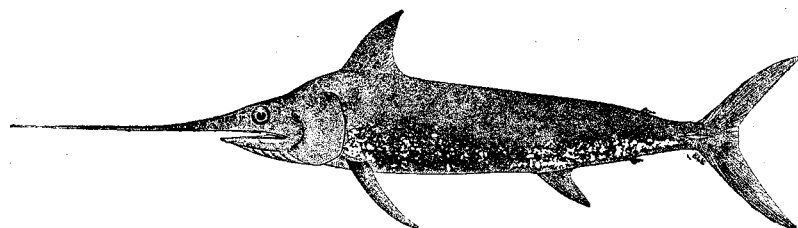


FIG. 506. *Xiphias gladius* Linnaeus, 3200 mm.

Specimens studied: Agathi (2), 2900 and 3100 mm. Kiltan (1), 2700 mm. Minicoy (3), 2600 to 3200 mm.

D₁. 40; D₂. 4; A₁. 18; A₂. 4; P. ii, 14.

Body elongate, compressed, the upper jaw produced into a powerful depressed sword. Head 1.9-2.2 in standard length, 2.3-2.6 in total length. Depth of body 6-7 in standard length, 7.2-8.2 in total length. Height of first dorsal 2.7-3.4 in head. Posterior dorsal spines lost with age leaving only the anterior falcate lobe with 16 to 19 spines. Second dorsal and anal short. Pectoral equal to or slightly shorter than first dorsal lobe. Height of first anal lobe about half that of first dorsal. Ventrals absent. Caudal peduncle with a single large keel on either side. Colour: Dusky grey or bronze purple on back becoming lighter below. Dorsal lobe and pectoral dark.

Local names: *Mas-hibaru* (Minicoy). *Kuthira-meen* (other islands).

Distribution: In all tropical and temperate seas.

Note: The fish is reported to occur around all islands of the Laccadive Archipelago. Its leaping habit is known to the fishermen who are afraid of the possible injury to them in the course of its forward leap when getting hooked.

Suborder STROMATEOIDEI

Family STROMATEIDAE

Body variously oblong to ovate, compressed. Mouth small or moderate; a single series of small teeth in jaws and sometimes on palatines. Dorsal fin long with a distinct spinous and a soft part, sometimes almost separate. Ventrals thoracic, depressible into a groove, sometimes reduced or vanishing with age. Five to seven branchiostegals. Lateral sacs in the oesophagus lined with teeth. Lateral line complete.

507. *Psenes cyanophrys* Cuvier

Psenes cyanophrys Cuvier, in Cuvier and Valenciennes, Hist. Nat. Poissons, 9, p. 193, pl. 265, 1833. Smith, Fishes of Southern Africa, p. 306, 1949. de Beaufort, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 9, p. 88, fig. 18, 1951. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 133/425).

Psenes Javanicus Day, Fishes of India, p. 237, pl. 51 C, fig. 1, 1878.

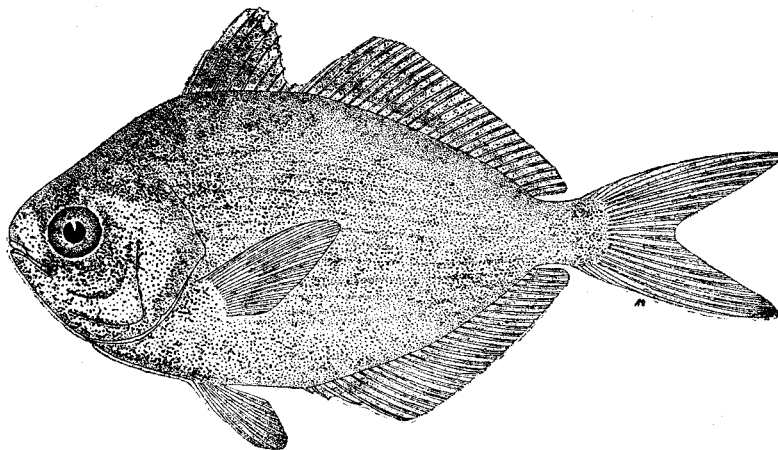


FIG. 507. *Psenes cyanophrys* Cuvier, 54 mm.

Specimens studied: Kiltan (2), 40 and 46 mm. Minicoy (11), 18 to 54 mm.

D. X, 23-26; A. III, 24-26; P. 17-18; V. I, 5. Ll. 55-59; Ltr. 7+1+15. GR. 7-8+1+18-19.

Body compressed, deeply ovate. Head 2.6-2.9 in standard length, 3.3-3.9 in total length. Depth of body 1.7-1.9 in standard length, 2.3-2.7 in total length. Eye 3.0-3.6 in head, 0.6-0.7 in snout and 1.0-1.3 in convex interorbital space. Mouth oblique, maxillary reaching to below anterior fourth of eye. A single row of fine teeth in jaws. Vomer and palatines edentulous. Origin of first dorsal anterior to a level from hind border of operculum. Third dorsal spine longest, equal to postorbital length of head. Pectoral as long as head without snout. Ventral depressible into a groove, equal to or slightly longer than postorbital length of head. Lateral line curved convexly to base of caudal. Colour: Brown, slightly lighter below with narrow dark longitudinal lines along scale rows. Dorsal and anal dark. Pectoral and caudal pale yellowish. Ventral brownish, becoming blackish distally.

Local names: *Fiyala-dari* (Minicoy). *Kuluvel-chala* (Kiltan).

Distribution: East coast of South Africa, Madagascar, Laccadives, coasts of India, Indonesia, Philippines and New South Wales and Atlantic.

Suborder GOBIOIDEI

Oval to elongate, sometimes slightly compressed. Body usually with ctenoid or cycloid scales, sometimes naked. Usually two dorsal fins, sometimes joined only at the base. Pelvics thoracic or subjugular consisting of one feeble spine and 4 or 5 rays, often partly or completely united to form a cup like disc, sometimes separate. Gill openings wide or restricted to sides.

1. Ventral fins completely separate ELEOTRIDAE
 Ventral fins partly or wholly united 2
2. Two dorsal fins completely separated or connected at their bases only
 GOBIIDAE
 One dorsal fin 3
3. Body scaly; dorsal and anal fins confluent with the caudal
 TRYPACHENIDAE
 Body naked; dorsal and anal fins completely free from caudal fin
 KRAEMERIIDAE

Family ELEOTRIDAE

Body elongate. Mouth moderate, more or less terminal. Teeth feeble, palate usually edentulous. Gill membranes variably attached to isthmus. 4 gills. Pseudobranchiae usually present, reduced. Two dorsal fins, separate or united at their bases, first generally with six feeble spines. Ventrals with 4 or 5 soft rays, the fins fully separate, sometimes a feeble basal membrane. Scales small or moderate, sometimes partly or completely naked. Lateral line absent.

1. Margin of preopercle with 4 to 7 spines. Third dorsal spine filamentous.
 Dark brown spots on sides, a dark blue spot at upper edge of pectoral
 base *Asterropteryx semipunctatus*
 No spines on margin of preopercle 2
2. Less than 20 rays in soft dorsal and anal fins 3
 More than 20 rays in soft dorsal and anal fins 7
3. Ventrals usually with 4 soft fringed rays. Llat. 22-24. Base of pectoral
 generally with two dark blotches *Eviota distigma*
 Ventrals usually with 5 soft rays 4
4. Llat. about 30-42. Body moderately elongate 5
 Llat. more than 80. Body very elongate, compressed 6
5. Supraorbital crest denticulated. No papillae on head. Llat. about 30
 *Prionobutis koilomatodon*
 No denticulated supraorbital crest. Head with numerous papillae. Llat. 39-
 42 *Mucogobius liolepis*

6. Llat. about 110. Anal usually I, 17. Caudal fin rounded. Head with pearly band from maxillary to opercle *Eleotriodes strigatus*
 Llat. 89-92. Six to nine bluish spots on cheek, opercle and base of pectoral. Tip of third dorsal spine black *Eleotriodes sexguttatus*
7. Soft dorsal with I, 27 rays. A dark blue cross bar at base of lower half of pectoral. Body light orange to yellowish with bluish tinge on back *Ptereleotris microlepis*
 Dorsal with I, 24-25 rays. No dark bar at base of pectoral. Body pale white anteriorly, dusky to bluish posteriorly. Distal half of dorsal and anal and upper and lower rays of caudal bluish *Ptereleotris tricolor*

508. *Asterropteryx semipunctatus* Rüppell

Asterropteryx semipunctatus Rüppell, Atlas Reise Nordl. Africa, Fische Rothen Meeres, p. 138, pl. 34, fig. 4, 1828. Koumans, Mem. Indian Mus., 13, p. 310, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 290, fig. 73, 1953. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 136/426).

Asterropteryx semipunctatus Smith, Ichth. Bull., 11, p. 143, pl. 2, J, 1958. Smith and Smith, Fishes of Seychelles, p. 47, pl. 90, J, 1963.

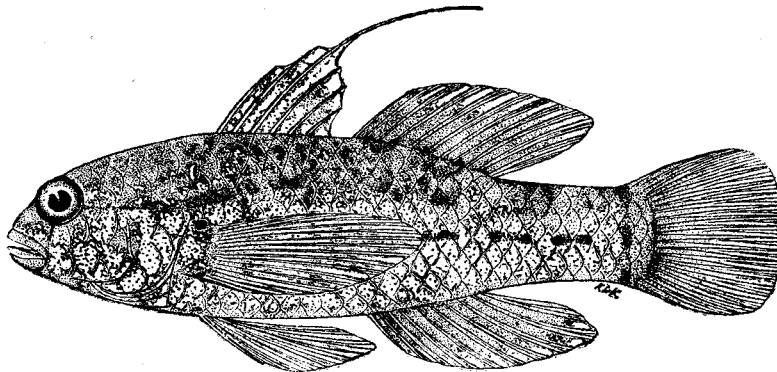


FIG. 508. *Asterropteryx semipunctatus* Rüppell, 31 mm.

Specimens studied: Kavarathi (5), 18 to 30 mm. Kiltan (5), 20 to 32 mm. Minicoy (4), 17 to 31 mm.

D₁. VI; D₂. I, 9-10; A. I, 8-9; P. 16-17; V. I, 5. Llat. 24-25; Ltr. 9.

Body compressed, deeper with age. Head equal to height of body, 3.2-3.4 in standard length, 4.0-4.2 in total length. Eye 3.2-3.5 in head, 0.7 in snout and 0.3 in interorbital space. Maxillary reaching to below front border of eye. Narrow bands of teeth in jaws, outer row enlarged, hindmost in lower jaw caniniform. Preopercle margin with 4 to 7 short spines. Anterior nostril tubular, post-

erior nostril a simple pore. Tongue rounded. Third dorsal spine filamentous, reaching to base of caudal in some specimens. 7 predorsal scales. Head scaly except snout and interorbital space. Pectoral half eye diameter longer than head. Ventral slightly shorter than pectoral. Colour: Brown with dark brown spots in rows on sides. Dorsal, anal and caudal brownish. Pectoral and ventral pale; a dark blue spot at upper edge of base of pectoral.

Distribution: East coast of Africa, Red Sea, Laccadives, Indonesia, Philippines, Japan and Mariana, Fiji, Society, Tuamotu and Hawaiian Islands.

509. *Eviota distigma* Jordan and Seale

Eviota distigma Jordan and Seale, Bull. U. S. Bur. Fish., 25, p. 389, fig. 79, 1906. Koumans, Mem. Indian Mus., 13, p. 320, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 319, 1953. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 136/427).

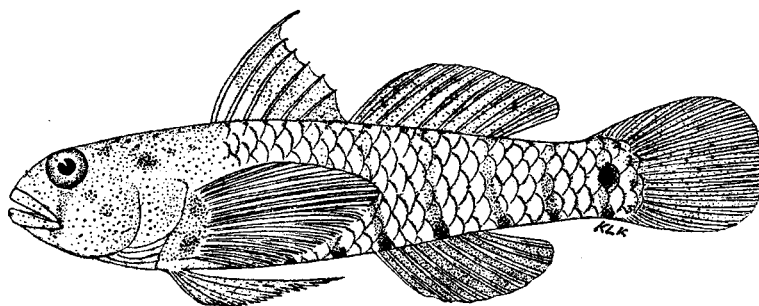


FIG. 509. *Eviota distigma* Jordan and Seale, 16 mm.

Specimens studied: Chetlat (6), 14 to 16 mm. Minicoy (11), 13 to 17 mm.

D₁. VI; D₂. I, 8-10; A. I, 7-8; P. 15-17; V. I, 4. Llat. 22-24; Ltr. 7.

Head 3.3-3.8 in standard length, 4.1-4.6 in total length. Depth of body 4.3-4.7 in standard length, 5.3-5.7 in total length. Eye 3.3-3.8 in head, 0.6-0.7 in snout and about 0.5-0.6 in interorbital space. Maxillary reaching about to below middle of eye. 2 or 3 rows of villiform teeth in jaws, outer row with a few caninoid teeth on sides. Anterior nostril a short tube on snout, posterior nostril with raised rim in front of eye. Gill opening extending to opposite lower edge of base of pectoral. Pectoral and ventral equal to or slightly longer than head. Pectoral with 8 or 9 upper rays and the lowest ray simple, others divided. Ventral rays fringed. Caudal fin rounded. Colour: Greenish to translucent in life, changing on preservation. 2 dark spots behind eye and less distinct spots on nape; a dark streak from eye towards corner of mouth. Eight dark blotches from below pectoral to caudal peduncle often extending upwards as transverse bars; a dark blotch on side of caudal peduncle just at the base of caudal; base of pect-

oral dark or with two dark blotches and with a few dots on some of the scales on sides of body. Vertical fins dotted, anal often duskier than others. Pectoral whitish.

Distribution: East coast of South Africa, Aldabra, Seychelles, Laccadives, Andamans, Indonesia, Philippines and Fiji, Samoan and Society Islands.

Note: The specimens vary greatly in colouration and they agree closely to *Eviota verna*, *E. stigmatopon* and *E. nebulosa* described by Smith from the Western Indian Ocean.

510. *Prionobutis koilomatodon* (Bleeker)

Eleotris koilomatodon Bleeker, Verh. Bat. Gen., 22, p. 21, 1849.

Butis caperatus Smith, Fishes of Southern Africa, p. 339, pl. 73, fig. 939, 1949.

Eleotris caperata Day, Fishes of India, p. 315, 1878.

Prionobutis koilomatodon Koumans, Mem. Indian Mus., 13, p. 319, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 313, 1953. Smith, Ichth. Bull., 11, p. 142, pl. 2, D, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 136/428).

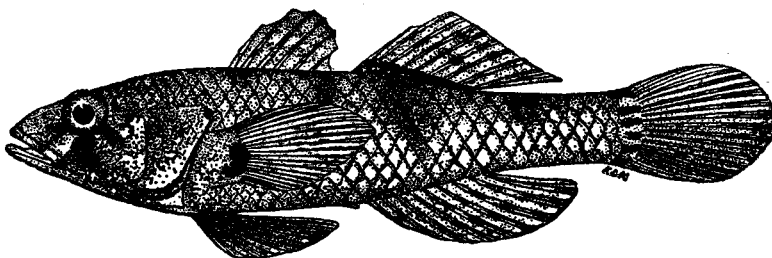


FIG. 510. *Prionobutis koilomatodon* (Bleeker), 38 mm.

Specimen studied: Ameni (1), 38 mm.

D₁. VI; D₂. I, 8; A. I, 8; P. i, 19; V. I, 5. Llat. 30; Ltr. 9; Pred. 13.

Head 3.1 in standard length, 3.8 in total length. Depth of body 4.2 in standard length, 5.2 in total length. Eye 3.9 in head, slightly more than snout and 0.6 in interorbital space. Supraorbital crest denticulated. Two crenulate ridges on each side of snout. Gill openings wide, extending to below preopercle margin. 4 or 5 series of fine teeth in jaws, the outer row enlarged. Upper part of cheek, opercle and nape scaled. Caudal peduncle about twice its height. Pectoral as long as head; ventral slightly shorter. Colour: Greenish brown, lighter below. First dorsal dusky, dark distally; second dorsal brownish with dark brown markings; anal and caudal brownish; pectoral pale yellowish with dark brown spot edged scarlet at base; a row of dark spots at base of caudal.

Distribution: Delagoa Bay in the Western Indian Ocean, Laccadives, coasts of India, Indonesia, Philippines and China.

511. *Mucogobius liolepis* (Koumans)

Callogobius liolepis Koumans, Prel. Rev. Gobioïd Fishes, p. 75, 1931. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 97, 1953.
Mucogobius liolepis Smith, Ichth. Bull., 11, p. 147, pl. 3, K, 1958. Jones and Kumaran, J. Mar. biol. Ass. India, 10, p. 329, fig. 10, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 136/526).

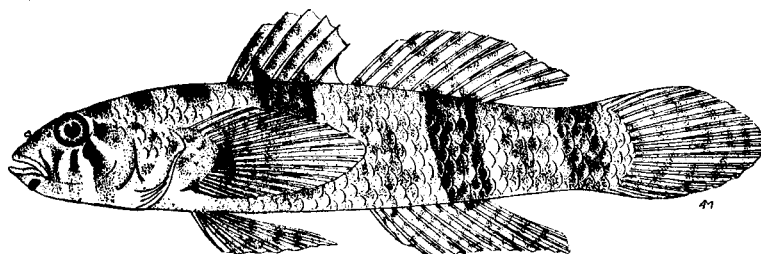


FIG. 511. *Mucogobius liolepis* (Koumans), 40 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (13), 27 to 40 mm.

D₁. VI; D₂. I, 9; A. I, 9; P. 19-20; V, I, 5. Ll. 39-42; Ltr. 12.

Head 3.3-3.5 in standard length, 4.1-4.3 in total length. Depth of body 4.0-4.5 in standard length, 5.0-5.5 in total length. Eye 4.4-4.8 in head, 1.1-1.3 in snout and about 0.7 in interorbital space. Maxillary extending to below front border of eye. Lower jaw prominent. A band of fine teeth in jaws, outer row slightly enlarged. Head with numerous papillae and two longitudinal mucous canals on cheek. Third or fourth dorsal spine longest, slightly longer than longest soft dorsal rays. Pectoral as long as head. Ventral slightly longer than head without snout. Caudal rounded. Scales on body cycloid. 17 or 18 predorsal scales. Scales on head reaching to behind eye. Cheek and opercle with a few concealed scales. Colour: Dusky green, lighter below. Head and body mottled with dark and three dark broad irregular cross bars on body, the first below first dorsal, second below second dorsal and the third on caudal peduncle. Fins dusky, spotted with dark; a black blotch on base of pectoral.

Distribution: Pemba in the Western Indian Ocean, Laccadives, Indonesia, New Hebrides and Solomon Islands.

512. *Eleotriodes strigatus* (Broussonet)

Gobius strigatus Broussonet, Desc. Ichth., 1, p. 1, pl. 1, 1782.
Eleotriodes strigatus Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 334, 1953. Smith, Ichth. Bull., 11, p. 151, pl. 1, D, 1958. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 119, fig. 14, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 136/429).

Specimens studied: Ameni (1), 101 mm. Minicoy (1), 42 mm.

D₁. VI; D₂. I, 17; A. I, 17; P. 21; V. I, 5. Llat. about 110; Ltr. 35.

Head 3.8 in standard length, 4.7 in total length. Depth of body 4.5 in standard length, 5.7 in total length. Eye 4.7 in head, 1.3 in snout and 1.3 in interorbital space. Maxillary reaching to below middle of eye. Teeth in a single row in upper jaw, 2 canines on either side in front. Teeth in lower jaw enlarged, 1 or 2 curved canines laterally. 2nd, 3rd and 4th dorsal spines filamentous. Longest dorsal and anal rays somewhat equal in length. Pectoral and ventral equal to head without snout. Caudal fin rounded. Colour: Yellowish white. A pearly band narrowly edged with black from maxillary, below eye to opercle and an ill defined streak on lower part of cheek. A bluish spot behind eye. Fins yellowish white, median rays of caudal slightly dusky.

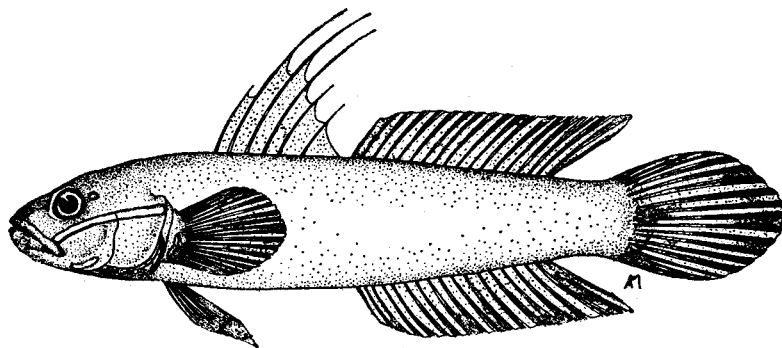


FIG. 512. *Eleotriodes strigatus* (Broussonet), 101 mm. (after Jones and Kumaran)

Local name: *Mannunni* (Ameni).

Distribution: East coast of Africa, Laccadives, Indonesia, Philippines and New Hebrides, Fiji, Samoan and Society Islands.

513. *Eleotriodes sexguttatus* (Valenciennes)

Eleotris sexguttatus Valenciennes, in Cuvier and Valenciennes, Hist. Nat. Poissons, 12, p. 254, 1837.

Eleotriodes sexguttatus Koumans, Mem. Indian Mus., 13, p. 326, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 339, fig. 82, 1963. Munro, Fishes of Ceylon, p. 231, pl. 45, fig. 678, 1955. Smith, Ichth. Bull, 11, p. 150, pl. 2, G, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 136/430).

Eleotris sexguttata Day, Fishes of India, p. 311, 1878.

Specimens studied: Agathi (1), 89 mm. Ameni (1), 144 mm. Chetlat (1), 42 mm. Minicoy (2), 99 and 103 mm.

D₁. VI; D₂. 12; A. I, 12; P. 19-20; V. I, 5. Llat. 89-92; Ltr. 24-27.

Head 3.4-3.6 in standard length, 4.3-4.6 in total length. Depth of body 5.1-5.4 in standard length, 6.8-7.2 in total length. Eye 4.8-5.3 in head, 1.4-1.6 in snout and 0.8 in interorbital space. Upper jaw with a single row of teeth, 3 to 5 in front of each side caninoid. Lower jaw with 2 rows of teeth in front and one row laterally, 5 or 6 enlarged teeth anteriorly on either side. Third dorsal spine longest, about one eye diameter shorter than head. Longest pectoral ray equal to head without snout. Ventral slightly shorter than pectoral. Colour: Uniform yellowish white. 6 to 9 bluish spots on cheek, opercle and base of pectoral. Fins yellowish. Tip of third dorsal spine black. Caudal and anterior part of anal with orange spots in live specimens, disappearing in preserved material.

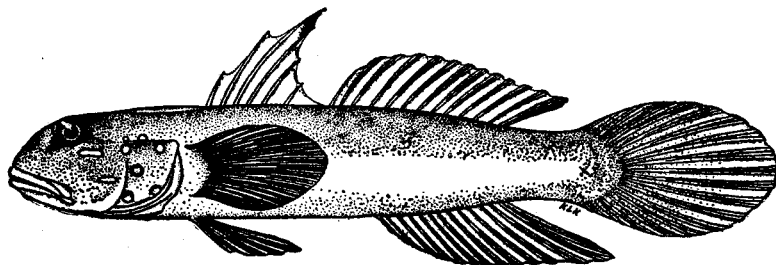


FIG. 513. *Eleotriodes sexguttatus* (Valenciennes), 89 mm.

Local name: *Mannunni* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Solomon, New Hebrides and Samoan Islands.

514. *Ptereleotris microlepis* (Bleeker)

Eleotris microlepis Bleeker, Nat. Tijds. Ned.-Ind., 2, p. 102, 1856.

Ptereleotris microlepis Koumans, Mem. Indian Mus., 13, p. 325, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 367, fig. 91, 1953. Smith, Ichth. Bull., 11, p. 155, pl. 1, C, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 136/431).

Specimens studied: Minicoy (19), 32 to 66 mm.

D₁. VI; D₂. I, 27; A. I, 26-27; P. 21-22.

Head 4.3-4.6 in standard length. 5.1-5.7 in total length. Depth of body 5.8-6.2 in standard length, 6.8-7.5 in total length. Eye 3.4-3.7 in head, 0.8 in snout and equal to interorbital space. Maxillary extending to below anterior border of pupil. Teeth in narrow bands in jaws, outer row enlarged. Pectoral equal to head without snout. Ventral slightly shorter than head. Caudal slightly

emarginate. Colour: Light orange to yellowish with bluish tinge on back. A dark blue cross bar at base of lower half of pectoral. Fins yellowish, dorsal sometimes bordered with blue.

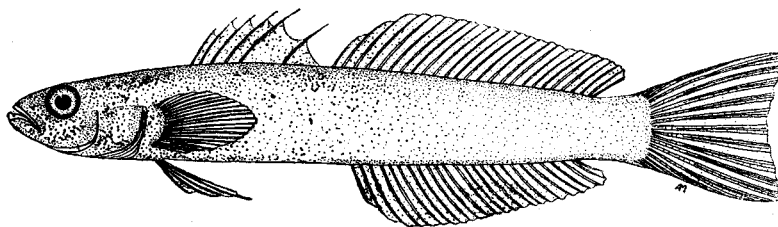


FIG. 514. *Ptereleotris microlepis* (Bleeker), 53 mm.

Local name: *Fula* (Minicoy).

Distribution: Coast of East Africa and neighbouring islands, Laccadives, Andamans, Indonesia and Society, Christmas, Fanning and Tuamotu Islands.

515. *Ptereleotris tricolor* Smith

Ptereleotris tricolor Smith, Ann. Mag. Nat. Hist., (12) 9, p. 817, fig. 1, 1956. Smith, Ichth. Bull., 11, p. 155, pl. 1, A & B, 1958. Smith and Smith, Fishes of Seychelles, p. 50, pl. 89, A & B, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 119, fig. 15, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 136/432).

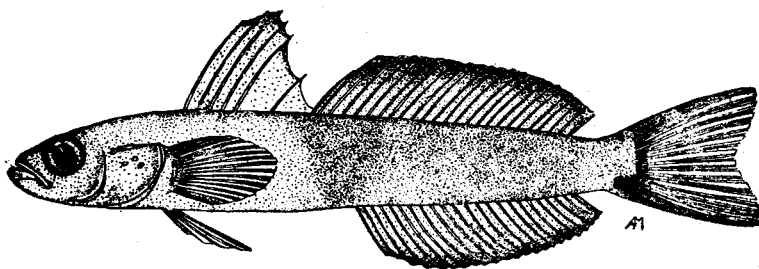


FIG. 515. *Ptereleotris tricolor* Smith, 49 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (11), 28 to 49 mm.

D₁. VI; D₂. I, 24-25; A. I, 23-25; P. 21-22.

Head 4.1-4.3 in standard length, 4.8-5.0 in total length. Depth of body 5.7-5.8 in standard length, 6.8-7.1 in total length. Eye 3.6-3.8 in head, 0.7-0.8 in snout and equal to or a little less than interorbital space. Teeth in narrow bands in jaws, outer series larger. Gill opening wide but only lateral. Pectoral equal to head without snout. Colour: Pale white anteriorly, rest of body dusky to bluish. First dorsal pale yellowish, margin narrowly bluish. Distal half of

soft dorsal and anal and upper and lower rays of caudal bluish, median rays of caudal yellowish. A dark ocellus at base of lower caudal rays in juveniles.

Local name: *Fula* (Minicoy).

Distribution: Coast of East Africa and neighbouring islands of Zanzibar, Pemba, Seychelles and Aldabra in the Western Indian Ocean and Minicoy in the Laccadives in the Central Indian Ocean.

Family GOBIIDAE

Body oblong to elongate. Mouth more or less terminal. Two dorsal fins, the first of flexible spines. Ventrals thoracic or subjugular, united, sometimes at base only. Gill membranes variably attached to isthmus. 4 gills, the first slit sometimes closed. Pseudobranchiae usually present. Scales ctenoid or cycloid, sometimes wanting. Lateral line absent.

1. Body more or less oval, compressed 2
Body more or less elongate, subcylindrical 4
2. Large scales on body *Paragobiodon echinocephalus*
Body naked 3
3. One or two canines on each side of lower jaw. First dorsal fin lower than the second. Pale to blackish; several narrow bluish transverse stripes on head and anterior part of body often present *Gobiodon rivulatus*
Three or four canines on each side of lower jaw. Height of dorsal fins equal; first ray of first dorsal fin longest. Yellow to orange with four transverse bluish lines, three on head and the fourth at base of pectoral; a black spot at upper edge of operculum *Gobiodon citrinus*
4. Caudal fin longer than head 5
Caudal fin not longer than head 8
5. A single row of teeth in upper jaw. Llat. about 55. Body pale orange *Oxyurichthys microlepis*
Two or three rows of teeth on side of upper jaw; two canines on each side in front. Llat. about 55. Pale yellowish with 8 dark spots on middle of sides and another row of smaller spots above ... *Ctenogobiops crocineus*
Several rows of teeth in upper jaw. Llat. not more than 30 6
6. Second dorsal with I, 10-11 rays. Anal with I, 11 rays. Llat. 30. A violet streak from eye to behind maxillary; 5 irregular brown markings on sides *Acentrogobius cauerensis*
Second dorsal with I, 10 rays. Anal with I, 9 rays 7
7. Upper rays of pectoral free, silk-like. Two rows of large spots on body *Acentrogobius ornatus*
Upper rays of pectoral not free. Five elongate black spots on middle of sides and smaller blackish spots above and below *Acentrogobius aestuarius*

8. Two rows of teeth in upper jaw 9
 Several rows of teeth in upper jaw 11
9. Llat. more than 50. About 30 predorsal scales. 5-6 transverse bands on head and body *Amblygobius albimaculatus*
 Llat. not more than 35 10
10. Llat. 32-35. Reddish brown with yellowish transverse bands on head and body *Quisquilius eugenius*
 Llat. 27-28. Uniform reddish with five yellowish vertical stripes on lower part of head and two stripes from hind border of eye obliquely upwards *Quisquilius inhacae*
11. Basal membrane of ventrals very weak or absent. Less than 25 scales in lateral series *Fusigobius neophytus*
 Basal membrane of ventrals well developed. More than 35 scales in lateral series 12
12. Head scaled between and behind the eyes, on cheek and opercle. Llat. 37-39 *Bathygobius petrophilus*
 Head scaled above from behind the eyes. Cheek and opercle naked. Llat. 38-41 *Bathygobius fuscus*

516. *Paragobiodon echinocephalus* (Rüppell)

Gobius echinocephalus Rüppell, Atlas Reise Nordl. Afrika, Fische Rothen Meeres, p. 136, fig. 3, pl. 34, 1828.

Gobius melanosoma Day, Fishes of India, p. 297, pl. 64, fig. 1, 1878.

Paragobiodon echinocephalus Koumans, Mem. Indian Mus., 13, p. 203, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 3, fig. 1, 1953. Munro, Fishes of Ceylon, p. 233, pl. 45, fig. 679, 1955. Smith, Ichth. Bull., 13, p. 218, pl. 12, B, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 127/433).

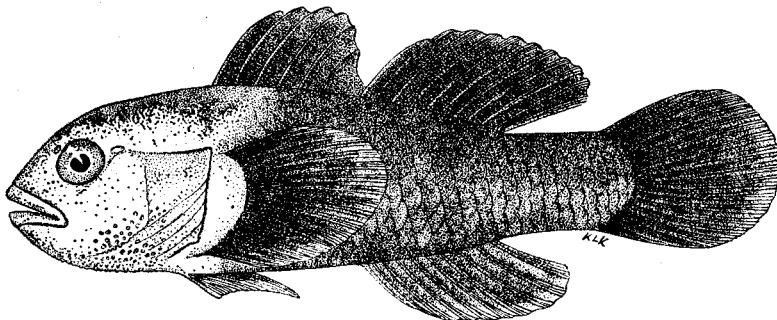


FIG. 516. *Paragobiodon echinocephalus* (Rüppell), 22 mm.

Specimens studied: Agathi (3), 21 to 24 mm. Minicoy (9), 18 to 24 mm.

D₁. VI; D₂. I, 9-10; A. I, 8-9; P. 20-21. Ll. 24-27; Ltr. 9-10.

Head 2.9-3.2 in standard length, 3.7-4.0 in total length. Depth of body 3.1-3.3 in standard length, 3.8-4.1 in total length. Eye 3.6-4.1 in head, equal to or a little more than snout and slightly less than interorbital space. Teeth in jaws in several rows, outer enlarged, a pair of canines at front of lower jaw. Head, nape and below anterior rays of first dorsal naked. Head and nape covered with cilia. Pectoral a little shorter than head. Ventral equal to or more than postorbital length of head. Colour: Body brown; head yellowish to pink. Fins dark to black.

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China and Solomon, Society and Tuamotu Islands and Australia.

517. *Gobiodon rivulatus* (Rüppell)

Gobius rivulatus Rüppell, Atlas Reise Nordl. Afrika, Fische Rothen Meeres, p. 136, 1828.

Gobiodon quinquestrigatus Koumans, Mem. Indian Mus., p. 211, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 10, fig. 2, 1953. Munro, Fishes of Ceylon, p. 235, pl. 45, fig. 682, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959.

Gobiodon quinquestrigatus Day, Fishes of India, p. 297, 1878.

Gobiodon rivulatus Smith, Ichth. Bull., 13, p. 219, pl. 10, K, L, and N, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. OMFRI-LA-F. 137/434).

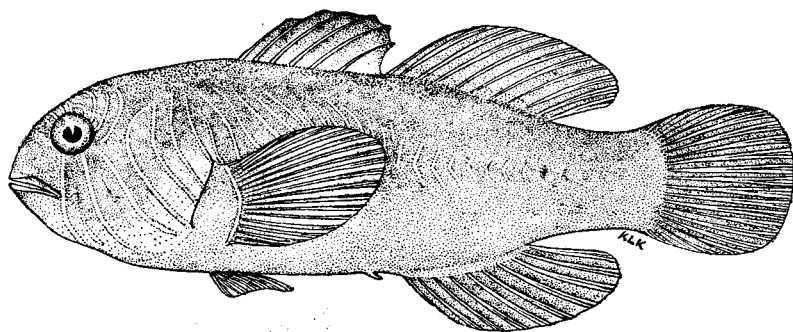


FIG. 517 a. *Gobiodon rivulatus* (Rüppell), 25 mm.

Specimens studied: Agathi (11), 18 to 24 mm. Chetlat (17), 21 to 26 mm. Kalpeni (14), 16 to 26 mm. Kavarathi (18), 20 to 24 mm. Minicoy (13), 18 to 23 mm.

D₁. VI; D₂. I, 10; A. I, 9; P. 18-20.

Head 3.1-3.5 in standard length, 3.9-4.3 in total length. Depth of body 2.9-3.3 in standard length, 3.4-4.1 in total length. Eye 3.9-4.5 in head, 0.9-1.1 in snout and 0.7 in interorbital space. Maxillary reaching to below anterior third of eye. Teeth in several rows in jaws, 1 or 2 canines on either side in front of lower jaw. Gill opening not extending to before the base of lower rays of pect-

oral fin. First dorsal fin almost equal in height to second dorsal fin. First spine of dorsal shorter than the following spines. Scales wanting, head and body slimy. Pectoral slightly shorter than head. Ventral equal to or a little shorter than postorbital length of head. Colour: Orange to blackish. Head and anterior part of body often with bluish transverse stripes. Fins darker than body.

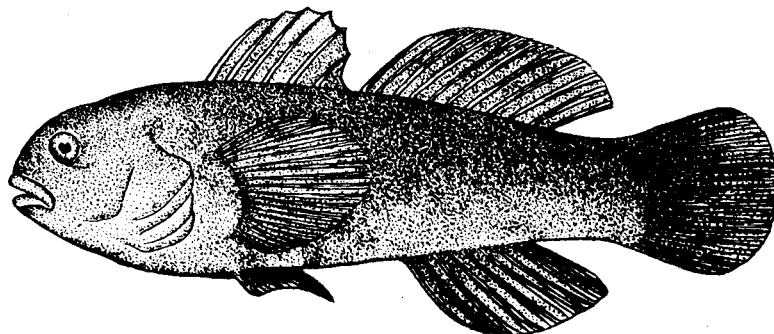


FIG. 517 b. *Gobiodon rivulatus* (Rüppell), 22 mm.

Local names: *Murakka-mas* (Minicoy). *Bara-chala* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia and New Hebrides, Fiji, Samoan, Society and Tuamotu Islands and Australia.

518. *Gobiodon citrinus* (Rüppell)

Gobius citrinus Rüppell, Neue Wirbelt. Fische, 139, pl. 32, fig. 4, 1838.

Gobiodon citrinus Day, Fishes of India, p. 298, pl. 64, fig. 2, 1878. Koumans, Mem. Indian Mus., 13, p. 209, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 11, 1953. Munro, Fishes of Ceylon, p. 233, pl. 45, fig. 680, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 137/435).

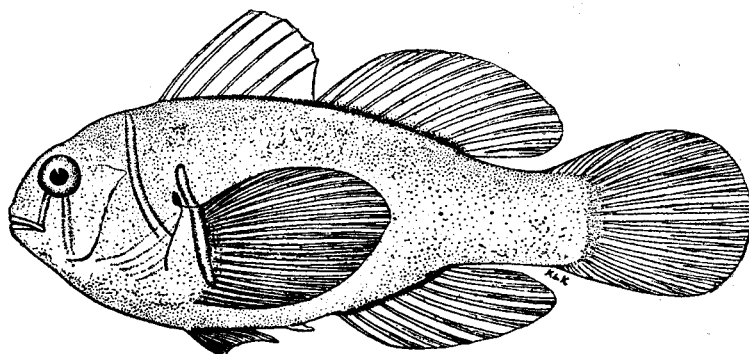


FIG. 518. *Gobiodon citrinus* (Rüppell), 42 mm.

Specimens studied: Minicoy (7), 17 to 47 mm.

D₁. VI; D₂. I, 10; A. I, 9; P. 19-20.

Body compressed. Head 3.1-3.3 in standard length, 4.2-4.3 in total length. Depth of body 2.4-2.6 in standard length, 3.3-3.5 in total length. Eye 3.4-3.6 in head, 0.9-1.0 in snout and equal to interorbital space. Maxillary reaching to beyond front border of pupil. A few rows of teeth in jaws, outer row enlarged; 3 or 4 canines on each side of symphysis in lower jaw. Gill opening not reaching to before lower rays of pectoral. First dorsal spine subequal with 2 to 4 spines. Pectoral fin slightly longer than head. Colour: Body and fins yellow to orange. Four transverse bluish lines, one from eye to maxillary, the second from eye to preopercle, the third from front of dorsal to middle of border of operculum and the fourth on base of pectoral. A black spot at upper edge of operculum. Base of dorsal fins and anal with blue longitudinal band.

Local name: *Reendumurukka-mas* (Minicoy).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Palau, Caroline, Solomon, Samoan and Tonga Islands and south to Australia.

519. *Oxyurichthys microlepis* (Bleeker)

Gobius microlepis Bleeker, Verh. Bat. Gen., 22, p. 35, 1849.

Gobius cristatus Day, Fishes of India, p. 291, pl. 62, fig. 8, 1878.

Oxyurichthys microlepis Koumans, Mem. Indian Mus., 13, p. 221, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 41, fig. 9, 1953. Munro, Fishes of Ceylon, p. 236, pl. 45, fig. 687, 1955. Smith, Ichth. Bull., 13, p. 203, fig. 20, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 27, 1969 (Cat. No. CMFRI-LA-F. 137/436).

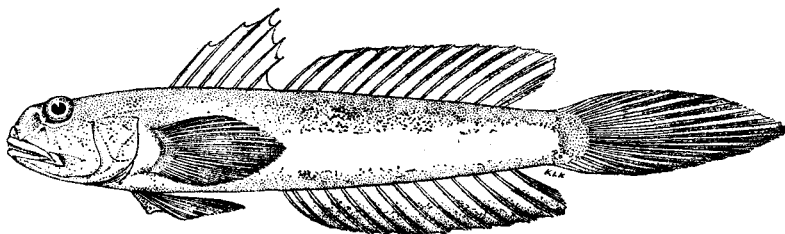


FIG. 519. *Oxyurichthys microlepis* (Bleeker), 110 mm.

Specimen studied: Minicoy (1), 110 mm.

D₁. VI; D₂. I, 12; A. I, 13; P. 22. Ll. 57; Ltr. 14.

Head 4.2 in standard length, 5.9 in total length. Depth of body 5.3 in standard length, 7.4 in total length. Eye 4.1 in head, equal to snout and 0.4 in interorbital space. Maxillary reaching to below posterior half of eye. Teeth

in a single series in upper jaw; in lower jaw in 2 or 3 rows, inner row enlarged anteriorly. Median line of head and nape naked. Spines of first dorsal flexible, higher than second dorsal. Pectoral equal to length of head, ventral a little shorter than pectoral. Caudal pointed, about twice length of head. Colour: Pale orange. Dorsal and pectoral orange. Anal yellowish bordered with violet. Caudal bordered below with violet. Inner rays of ventral violet.

Distribution: East coast of Africa, Minicoy in the Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China and Japan.

520. *Ctenogobiops crocineus* Smith

Ctenogobiops crocineus Smith, Ichth. Bull., 13, p. 191, pl. 11, K, 1959. Smith and Smith, Fishes of Seychelles, p. 47, pl. 64, K, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 12, p. 195, fig. 1 d, 1970.

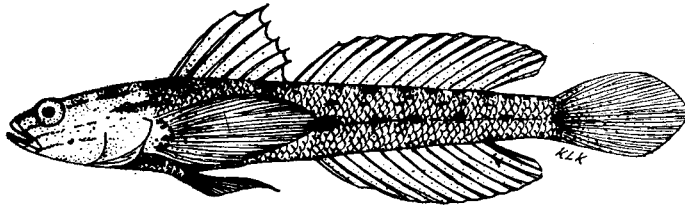


FIG. 520. *Ctenogobiops crocineus* Smith, 39 mm. (after Jones and Kumaran)

Specimen studied: Agathi (1), 39 mm.

D₁. VI; D₂. I, 12; A. I, 11; P. 18. Ll. 55; Ltr. 13.

Head 4.0 in standard length, 5.1 in total length. Depth of body 5.7 in standard length, 6.9 in total length. Eye 4.5 in head and equal to snout. Eyes adjacent. Gill openings wide, reaching to front of preopercle margin. Mouth slightly oblique, maxillary reaching to below hind third of eye. Two moderate canines in front on each side of upper jaw. A narrow band of fine teeth in lower jaw, the anterior ones larger. Second dorsal spine longest, slightly shorter than head. Pectoral equal to head. Ventral slightly shorter than pectoral. Head, nape, chest and base of pectoral naked. Caudal somewhat rounded. Colour: Pale yellowish with 8 dark spots in a row on middle of sides, another row of smaller spots above and a few dark spots along base of dorsal fins. A few dark spots on nape. Fins pale yellowish.

Distribution: Known only from Mahe in the Seychelles group of islands and Agathi in the Laccadives.

Note: Differs from the description of Smith (1959) in having a more slender body, head being 4 and depth being 5.7 in standard length as against 3.3 and 4.8-5.2 respectively given by Smith.

521. *Acentrogobius cauerensis* (Bleeker)

Gobius cauerensis Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 269, 1853.

Acentrogobius cauerensis Koumans, Mem. Indian Mus., 13, p. 231, 1941. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 68, 1953. Smith, Ichth. Bull., 13, p. 202, pl. 11, C and D, 1959. Palmer, Ann. Mag. Nat. Hist., 5 (13), p. 501, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 137/437).

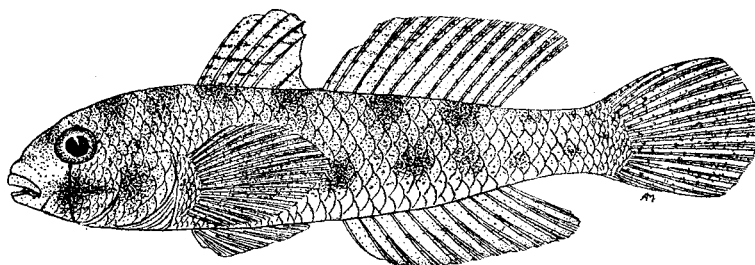


FIG. 521. *Acentrogobius cauerensis* (Bleeker), 60 mm.

Specimens studied: Agathi (2), 33 and 37 mm. Kadamat (1), 60 mm. Kavarathi (4), 33 to 52 mm. Minicoy (2), 43 and 74 mm.

D₁. VI; D₂. I, 10-11; A. I, 11; P. 15-16. Ll. 30; Ltr. 9-10.

Head 3.4-3.7 in standard length, 4.4-4.7 in total length. Depth of body 4.1-4.4 in standard length, 5.2-5.6 in total length. Eye 3.9-4.2 in head, equal to snout and about 0.4 in interorbital space. Teeth in several rows in jaws, in upper jaw 2 canines on each side, in lower jaw a curved canine on each side. Head scaled above behind eyes. Cheek and opercle scaled. First and second dorsal of about equal height, 9 or 10 predorsal scales. Pectoral as long as head. Ventral equal to or slightly shorter than pectoral. Colour: Greenish brown above, lighter below with 5 irregular dark brown markings on sides. Dark spots on upper part of opercle and nape. A violet streak from lower border of eye to behind maxillary and a shorter one at the angle of maxillary. First and second dorsal with dark spots, those at the anterior part of fins more prominent. Anal pale, distal part violet. Caudal and pectoral lighter, rays with pale to dark spots.

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, Indonesia, Japan and Hawaiian Islands.

522. *Acentrogobius ornatus* (Rüppell)

Gobius ornatus Rüppell, Atlas Reise Nordl. Afrika, Fische Rothen Meeres, p. 135, 1828. Day, Fishes of India, p. 294, pl. 63, fig. 1, 1878. Regan, Fauna and Geography of the Maldive and Laccadive Archipelagoes, 1, p. 275, 1903. Regan, Trans. Linn. Soc. London, 12 (3), p. 241, 1908.

Acentrogobius ornatus Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 71, 1953. Munro, Fishes of Ceylon, p. 241, pl. 46, fig. 700, 1955. Smith, Ichth. Bull., 13, p. 202, pl. 12, G, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 137/438).

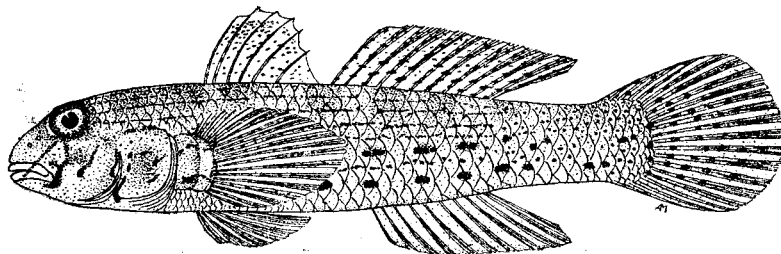


FIG. 522. *Acentrogobius ornatus* (Rüppell), 66 mm.

Specimen studied: Minicoy (1), 66 mm.

D₁. VI; D₂. I, 10; A. I, 9; P. 19. Ll. 29; Ltr. 9.

Head 3.7 in standard length, 4.7 in total length. Depth of body 4.7 in standard length, 6.0 in total length. Eye 4.0 in head, equal to snout and about 0.5 in interorbital space. Head scaled above behind eyes. 12 predorsal scales. Teeth in upper jaw with 3 or 4 canines in outer row on sides. Outer row of teeth in lower jaw with 1 canine on either side. First dorsal equal to or a little higher than 2nd dorsal. Anal lower than 2nd dorsal. Pectoral about as long as head, upper rays free. Ventral fin slightly shorter than pectoral. Colour: Olivaceous with greenish tinge, lighter below. Head with three transverse streaks, the first over angle of maxillary, the second on preopercle and the third on border of preopercle. Upper part of head and body with rows of small violet spots and two rows of large dark violet spots on lower sides of body. Dorsal fins light yellowish with small dark violet spots. Caudal and pectoral yellowish with dark spots. Anal pale yellowish with dusky border. Ventral orange with pale violet tip.

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan and Caroline, Fiji, Tonga and Samoan Islands and south to Australia.

523. *Acentrogobius aestuarius* Smith

Acentrogobius aestuarius Smith, Ichth. Bull., 13, p. 202, fig. 18, 1959. Jones and Kumaran, J. Mar. Biol. Ass. India, 9, p. 7, fig. 7, 1967. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 137/439).

Specimen studied: Bitra (1), 34 mm.

D₁. VI; D₂. I, 10; A. I, 9; P. i, 17. Ll. 28; Ltr. 7; Pred. 8.

Head 3.8 in standard length, 4.8 in total length. Depth of body 4.8 in standard length, 6.0 in total length. Eye 3.6 in head and about 0.8 in snout. Head slightly compressed. Gill opening extending to below base of pectoral. Front nostril a short tube, the hind nostril a plain pore before eye. Maxilla reaching nearly to below middle of eye. Teeth in narrow bands in jaws. Pectoral slightly longer than head. Ventral fin as long as head. Cheek naked. Nape scaled, scales reaching to hind margin of eye. Colour: Yellowish with five elongate black spots on middle of sides and smaller blackish spots above and below. A dark bar from eye to upper lip, one from lower border of eye to cheek and another from behind border of eye to above gill opening. Fins yellowish, rays of dorsal fins and caudal with dark spots; pectoral with 3 dark spots at base and anal dusky distally.

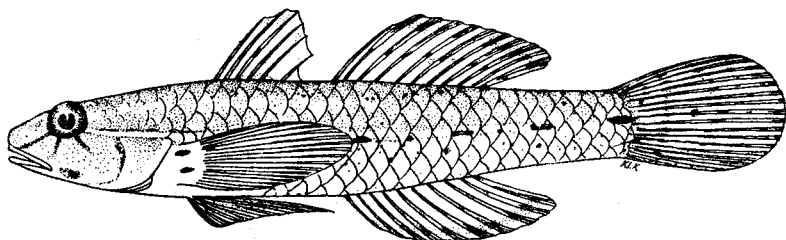


FIG. 523. *Acentrogobius aestuarius* Smith, 34 mm. (after Jones and Kumaran)

Distribution: Previously known only from two specimens from Inhabane in the Western Indian Ocean. Recently recorded from Bitra in the Laccadives in the Central Indian Ocean.

524. *Amblygobius albimaculatus* (Rüppell)

Gobius albimaculatus Rüppell, Atlas Reise Nordl. Afrika, Fische Rothen Meeres, p. 135, 1828.

Amblygobius albimaculatus Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 141, fig. 33. 1953, Smith, Ichth. Bull., 13, p. 204, pl. 10, B, 1959. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 117, fig. 12, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 137/440).

Specimens studied: Bitra (3), 46 to 80 mm. Minicoy (24), 38 to 87 mm.

D₁. VI; D₂. I, 13-14; A. I, 14; P. 18-19. Ll. 52-57; Ltr. 19-20.

Head 3.3-3.6 in standard length, 4.2-4.8 in total length. Depth of body 3.5-4.0 in standard length, 4.6-5.1 in total length. Eye 3.6-4.0 in head, equal to length of snout and 0.7-1.0 in interorbital space. Maxillary reaching to below anterior half of eye. Teeth in 3 rows in jaws, outer enlarged, the last one on either side in lower jaw a curved canine. About 30 predorsal scales. Pectoral

equal to or a little shorter than head. Ventral somewhat equal to pectoral. Colour: Variable, generally brownish green above, yellowish below. A few pale yellowish spots edged violet on head and nape. 5 or 6 transverse bands on body. Fins pale to orange, first dorsal with a diffuse dark spot between 4th and 5th spines and two pale oblique bands. Second dorsal with a pale submarginal band. Caudal fin with a dark spot at upper part of base and generally one spot each at upper and lower sides.

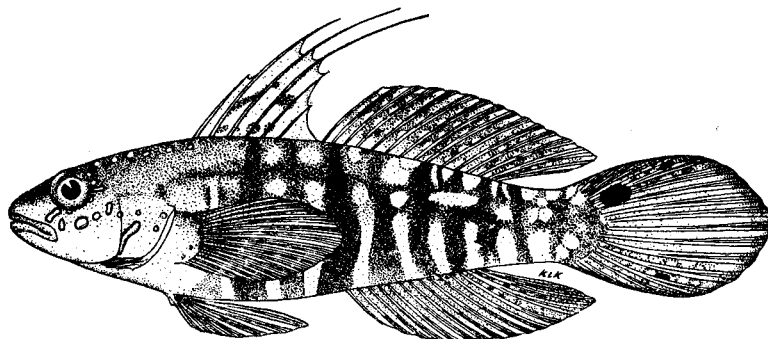


FIG. 524. *Amblygobius albimaculatus* (Rüppell), 76 mm. (after Jones and Kumaran)

Distribution: East coast of Africa, Red Sea, Laccadives, Indonesia, Philippines and Palau, Samoan and Society Islands and Australia.

525. *Quisquilius eugenius* Jordan and Evermann

Quisquilius eugenius Jordan and Evermann, Bull. U.S. Fish. Comm., 22, p. 203, 1902. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 131, fig. 30, 1953. Smith, Ichth. Bull., 13, p. 210, pl. 12, D, 1959. Smith and Smith, Fishes of Seychelles, p. 47, pl. 36, C, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 137/441).

Heteroleotris eugenius Smith, Fishes of Southern Africa, p. 507, pl. 101, fig. 935 a. 1949.

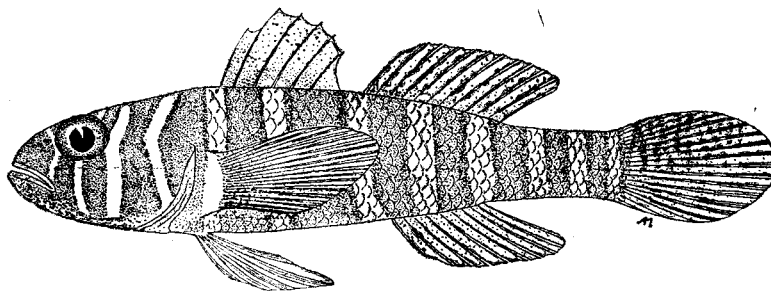


FIG. 525. *Quisquilius eugenius* Jordan and Evermann, 31 mm.

Specimens studied: Kalpeni (2), 23 and 24 mm. Kavarathi (1), 24 mm. Minicoy (10), 18 to 31 mm.

D₁. VI; D₂. I, 10-11; A. I, 8-9; P. 18-19; Ll. 32-35; Ltr. 14-15.

Head 3.1-3.4 in standard length, 3.9-4.2 in total length. Depth of body 3.6-3.8 in standard length, 4.5-4.8 in total length. Eye 3.2-3.4 in head, 0.7 in snout and 0.3-0.4 in interorbital space. Maxillary reaching to below lower margin of pupil. Teeth caniniform, in two rows in jaws, the outer row enlarged. Tongue truncate. Anterior nostril a short tube. Gill openings wide. Nape scaled, cheek naked, a few scales on upper edge of opercle. 16 or 17 predorsal scales. Pectoral fin as long as head. Ventral shorter than pectoral. Ventral fins joined at base by narrow membrane. Colour: Reddish brown with 12 yellowish transverse bands on head, body and tail. Dorsal fins and caudal light brownish with dark spots on rays; anal pale to light brownish; pectoral and ventral pale yellowish.

Distribution: East coast of South Africa, Laccadives, India, Indonesia, Philippines and Solomon, Tonga, Phoenix, Marquesas and Hawaiian Islands.

526. *Quisquilius inhacae* (Smith)

Gobius inhaca Smith, Ann. Mag. Nat. Hist., (12) 2, p. 103, 1949. Smith, Fishes of Southern Africa, p. 507, pl. 101, fig. 923 a, 1949.

Quisquilius inhaca Smith, Ichth. Bull., 13, p. 210, pl. 12, F, 1963.

Quisquilius inhacae Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 7, fig. 8, 1967. Jones Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 137/442).

? *Quisquilius anthioides* Smith, Ichth. Bull., 13, p. 210, pl. 10, F, 1959. Smith and Smith, Fishes of Seychelles, p. 47, pl. 63, F, 1963.

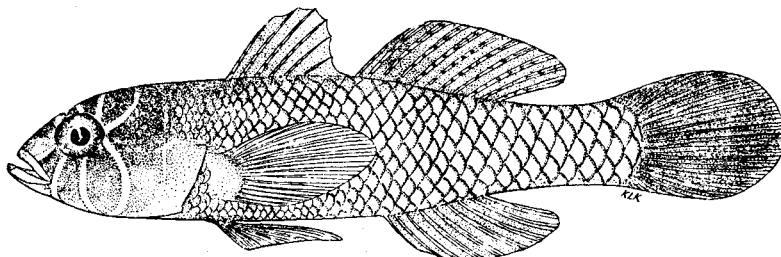


FIG. 526. *Quisquilius inhacae* (Smith), 22 mm. (after Jones and Kumaran)

Specimens studied: Minicoy (3), 18 to 22 mm.

D₁. VI; D₂. I, 10; A. I, 8; P. 17. Ll. 27-28; Ltr. 14.

Head 3.1-3.3 in standard length, 3.9-4.1 in total length. Depth of body 3.8-4.0 in standard length, 4.7-5.0 in total length. Eye 3.3-3.4 in head, about 0.8 in snout and 0.3 in interorbital space. Front nostril a short tube, the hind

one an open pore. Gill openings wide. Maxilla reaching to below front border of pupil. Teeth in jaws slender, caniniform, the outer series enlarged. Tongue truncate. Pectoral half length of snout shorter than head. Ventral shorter than pectoral. Ventral fins joined by a narrow membrane. Nape scaled, cheek naked, a few scales on upper part of opercle. 17 predorsal scales. Colour: Uniform red with five somewhat vertical yellowish stripes on lower part of head and two oblique stripes from hind border of eye upwards; the hind one joined to the fourth stripe on preopercle. Dorsal fins pale to light brownish with darker spots on rays. Other fins pale yellowish.

Distribution: Inhaca to Kenya in the Western Indian Ocean and Minicoy in the Laccadives.

527. *Fusigobius neophytus* (Günther)

Gobius neophytus Günther, Fische der Sudsee, 2, p. 174, pl. 198, fig. E, 1877.

Fusigobius neophytus Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 146, fig. 35, 1953. Jones and Kumaran, J. Mar. biol. Ass. India, 10, p. 330, fig. 11, 1968. Jones, Bull. cent. mar. Fish. Res. Inst. 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 137/527).

Fusigobius neophytus africanus Smith, Ichth. Bull., 13, p. 208, pl. 11, F, 1959. Smith and Smith, Fishes of Seychelles, p. 47, pl. 64, F, 1963.

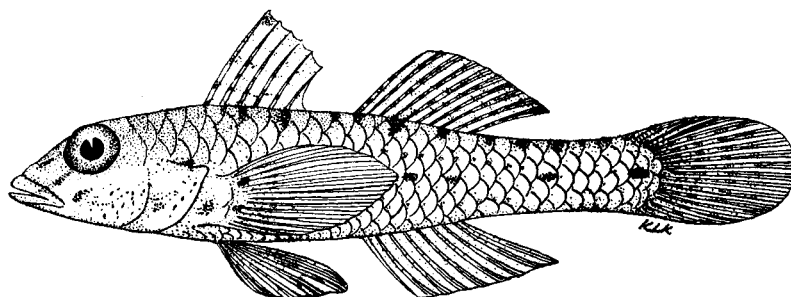


FIG. 527. *Fusigobius neophytus* (Günther), 35 mm. (after Jones and Kumaran)

Specimens studied: Agathi (1), 26 mm. Minicoy (4), 24 to 35 mm.

D₁. VI; D₂. I, 9; A. I, 8; P. i, 15-16; V. I, 5. LL. 23-24.

Head 3.1-3.3 in standard length, 4.1-4.3 in total length. Depth of body 4.2-4.4 in standard length, 5.4-5.6 in total length. Eye 3.2-3.5 in head and 1.0-1.1 in snout. Interorbital space very narrow. Mouth horizontal, maxillary reaching to a vertical from front margin of eye. Fine teeth in a narrow band in each jaw, outer series enlarged, 2 or 3 on side of lower jaw caninoid. Scales on head beginning behind eyes. Midline of nape naked. Scales on body ctenoid, deciduous. First dorsal spine equal to postorbital part of head with half eye

diameter. Rays of second dorsal and anal slightly shorter than first spine of dorsal. Pectoral slightly shorter than head. Ventral half length of snout shorter than head. Ventrals united, basal membrane absent. Colour: Whitish with 5 or 6 rows of brown spots on sides; a large black spot on base of caudal and a dark stripe from eye to upper jaw. A blackish spot between tip of first and second spine of dorsal, rest of the fin with dusky markings or spots, dorsal and caudal with dusky spots. Base of pectoral with two spots, ventral and anal lighter.

Distribution: Pinda, Zanzibar, Shimoni, Aldabra and Seychelles in the Western Indian Ocean, Laccadives, Indonesia, Philippines and Ryukyu, Caroline, Samoan, Society and Fiji Islands.

528. *Bathygobius petrophilus* (Bleeker)

Gobius petrophilus Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 476, 1853.

Bathygobius petrophilus Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 185, 1953. Smith, Ichth. Bull., 13, p. 212, 1959. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 118, fig. 13, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 137/443).

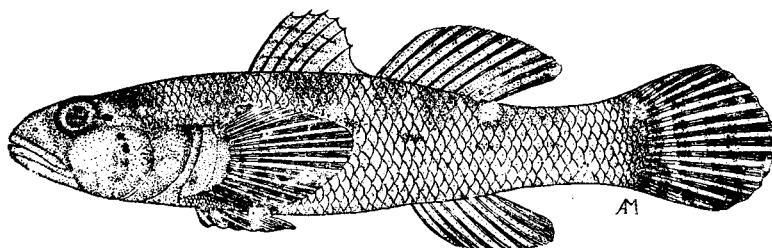


FIG. 528. *Bathygobius petrophilus* (Bleeker), 49 mm. (after Jones and Kumaran)

Specimens studied: Agathi (2), 56 and 71 mm. Kalpeni (2), 42 and 49 mm. Kiltan (8), 39 to 59 mm.

D₁. VI; D₂. I, 9-10; A. I, 8-9; P. 19-21; Ll. 37-39; Ltr. 12.

Head 3.1-3.4 in standard length, 3.8-4.2 in total length. Depth of body 4.3-4.9 in standard length, 5.3-6.0 in total length. Eye 3.7-4.1 in head, equal to or a little longer than snout and 0.5 in interorbital space. Outer row of teeth in both jaws enlarged. Second dorsal a little higher than first dorsal. Pectoral shorter than head, upper rays free. More than 25 predorsal scales. Colour: Dark brown to lighter; often with obscure dark marks on upper part of body. Fins brownish, first dorsal with 2 or 3 dusky bands. Rays of second dorsal, caudal and pectoral with dark spots.

Local name: *Mannunni* (other islands).

Distribution: Comoro Islands in the Western Indian Ocean, Laccadives in the Central Indian Ocean, Indonesia, Philippines, Japan and Fiji, Society and Hawaiian Islands.

529. *Bathygobius fuscus* (Rüppell)

Gobius fuscus Rüppell, Atlas Reise Nordl. Afrika, Fische Rothen Meeres, p. 137, 1828.

Bathygobius fuscus Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 187, fig. 45, 1953. Munro, Fishes of Ceylon, p. 239, pl. 46, fig. 695, 1955. Smith, Ichth. Bull., 13, p. 212, pl. 11, I, 1959. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959. Palmer, Ann. Mag. Nat. Hist., 5 (13), p. 501, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 137/444).

Gobius albo-punctatus Day, Fishes of India, p. 294, pl. 63, fig. 7, 1878.

Gobius elegans Day, Fishes of India, p. 293, 1878 (not of Cuvier and Valenciennes).

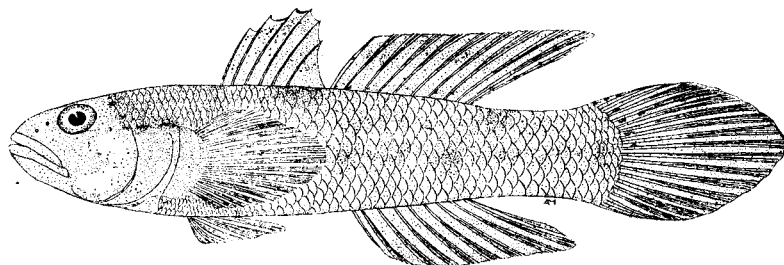


FIG. 529. *Bathygobius fuscus* (Rüppell), 72 mm.

Specimens studied: Agathi (11), 38 to 74 mm. Ameni (13), 32 to 55 mm. Kadamat (12), 36 to 48 mm. Kalpeni (22), 36 to 54 mm. Kavarathi (21), 34 to 61 mm. Minicoy (31), 27 to 75 mm.

D₁. VI; D₂. I, 9-10; A. I, 8-9; P. 19-21. Ll. 38-41; Ltr. 12-13.

Head depressed, 3.1-3.5 in standard length, 4.0-4.6 in total length. Depth of body 4.1-4.7 in standard length, 5.3-6.2 in total length. Eye 4.0-4.3 in head, 0.9-1.1 in snout and about 0.5-0.6 in interorbital space. Teeth in several rows, outer row in both jaws enlarged. Tongue somewhat bilobate. First and second dorsal almost of equal height. Pectoral a little shorter than head, upper rays free. Basal membrane of ventral with a lobe on either side. Predorsal scales 20 to 24, reaching to about eye. Colour: Variable; brownish to olivaceous, lighter below. Body often with two longitudinal rows of spots and 3 spots on head posterior to eye. Fins dark to dusky, sometimes with indistinct markings.

Local names: *Gali-funna* (Minicoy). *Mannunni* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Japan, Australia and islands in the Pacific and west coast of America.

Family TRYPAUCHENIDAE

Body elongate, generally slightly compressed. Eyes small, embedded in the skin. Upper margin of opercle with a pit opening to a cavity. Dorsal and anal fins long, without distinct spines in front and mostly united with caudal. Ventrals partly or completely united. Scales present.

530. *Trypauchen vagina* (Bloch and Schneider)

Gobius vagina Bloch and Schneider, Syst. Ichth., p. 73, 1801.

Trypauchen vagina Day, Fishes of India, p. 320, pl. 68, fig. 2, 1878. Koumans, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 10, p. 277, 1953. Munro, Fishes of Ceylon, p. 243, pl. 46, fig. 707, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 139/445).

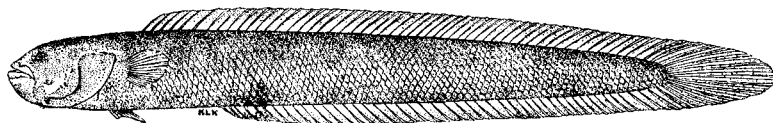


FIG. 530. *Trypauchen vagina* (Bloch and Schneider), 117 mm.

Specimen studied: Kalpeni (1), 117 mm.

D. VI, 46; A. I, 44; P. 16. Ll. 86; Ltr. 20.

Head 6.2 in standard length, 7.4 in total length. Depth of body 8.3 in standard length, 10.0 in total length. Eye very small and covered by skin. Maxillary extending to below eye. Teeth in jaws in 2 or 3 rows, outer row enlarged. Head, nape and breast naked. Dorsal and anal continuous with caudal. Pectoral about half length of head. Ventral less than pectoral. Caudal somewhat round. Colour: Uniform pink. Dorsal and anal with greyish outer margin. Caudal, pectoral and ventral yellowish.

Distribution: Persian Gulf, Laccadives, coasts of India, Ceylon, Indonesia, Indo-china, Taiwan and Japan.

Family KRAEMERIIDAE

Elongate and compressed. Mouth moderate, oblique; chin projecting beyond the snout. Minute teeth in bands in jaws; palatines edentulous. Tongue bilobed at tip. Eyes minute, adjacent to dorsal profile of head. Gill openings extending far forward. Dorsal fin usually single with 19 or 20 rays of which the first five nonstriated. Anal with 12 to 15 rays, the first nonstriated. Ventrals separate, with one spiniform ray and five rays. Body completely naked or scaled.

531. *Kraemeria samoensis* Steindachner

Kraemeria samoensis Steindachner, Sitzb. Akad. Wiss. Wien, 115, pl. 1, p. 41, 1906. Smith, Ichth. Bull., 13, p. 221, fig. 42, 1959. Smith and Smith, Fishes of Seychelles, p. 45, pl. 36, O, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 8, fig. 9, 1967. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 196/446).

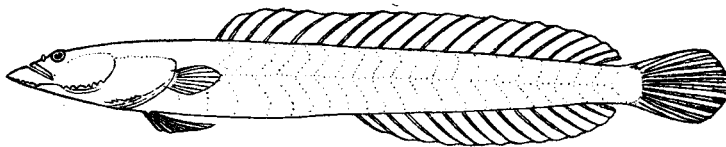


FIG. 531. *Kraemeria samoensis* Steindachner, 28 mm. (after Jones and Kumaran)

Specimens studied: Ameni (12), 25 to 28 mm. Minicoy (11), 15 to 28 mm.

D. IV, I, 14-15; A. I, 13-14; P. 8-9; V. I, 5.

Body elongate, somewhat compressed and naked. Head 4.0-4.6 in standard length, 4.5-5.2 in total length. Depth of body 7.8-8.6 in standard length, 8.8-9.9 in total length. Eyes very small, superior in position and close together. Interorbital space narrow. Upper margin of maxilla, lower margin of mandible and lower opercular margin scalloped. Anterior nostril tubular. Gill openings wide, gill membranes free from isthmus. Mouth oblique, lower jaw projecting considerably beyond tip of snout; chin fleshy, forming part of dorsal profile. Teeth minute in jaws and a few on palatines. Tongue forked. Origin of dorsal 1.2-1.3 length of head behind tip of snout. Dorsal with five and anal with one flexible nonstriated spiniform rays, other rays simple and striated. Fifth spiniform ray separated. Dorsal and anal separate from caudal fin. Origin of anal below 7th or 8th dorsal ray, midway between tip of snout and base of caudal or slightly nearer to the former and 2.15-2.30 head length from tip of snout. Pectoral 2.7-3.0 in head. Ventral about half length of head. Bases of ventrals united, first ray short, inner two rays longest. Colour: Translucent in life and whitish on preservation.

Local name: *Valuleve-mas* (Minicoy).

Distribution: Seychelles in the Western Indian Ocean, Laccadives in the Central Indian Ocean and Samoan and Marshall Islands in the Pacific.

Note: This species generally lives buried in loose sand very near to the shore and manages to escape when disturbed.

Suborder COTTOIDEI

Head generally with bony ridges or with spines. Body naked, wholly or partly scaled or covered with villi. Lateral line single. Usually one dorsal fin with a deep notch in between spines and rays or two distinct fins with very little interspace between them. Ventral fins thoracic, with one spine and 2 to 5 rays. Lower pectoral rays sometimes free.

1. Head greatly depressed, much broader than deep PLATYCEPHALIDAE
Head not depressed, usually deeper than broad 2
2. Gill membranes free from isthmus; body wholly or partly scaled SCORPAENIDAE
Gill membranes united with isthmus; no distinct scales 3
3. Body much compressed, orbicular, covered with fine villi; 7 or 8 dorsal spines; ventrals rudimentary CARACANTHIDAE
Body somewhat elongate, rough; head spiny; 8 to 17 dorsal spines; ventrals well developed SYNANCEIDAE

Family SCORPAENIDAE

Body somewhat elongate, moderately compressed. Head normally spiny, sometimes rough. Villiform teeth in bands in jaws and vomer and sometimes on palatines. A pair of nostrils on each side. A single dorsal fin along most of the back, the spinous part longer than soft part. Anal with II or III pungent spines. Pectoral well developed, sometimes extremely long. Gill membranes free from isthmus. Head, body and tail normally scaled, sometimes only rudimentary scales on body and head naked. Lateral line complete or incomplete.

1. Head without scales. Body much compressed *Taenianotus triacanthus*
Head with at least some scales on preopercle and opercle. Body not much compressed 2
2. Dorsal spines shorter than depth of body. Membrane of dorsal upto the ends of spines. Pectoral not reaching anal. Two or three spines on opercle 3
Dorsal spines usually longer than depth of body. Membrane between dorsal spines at base only. Pectoral reaching to or beyond anal. One spine on opercle 10
3. Twelve dorsal spines 4
Thirteen dorsal spines 9
4. A pit on upper part of head behind eyes. Head naked, excepting some scales on opercle and preopercle 5
No pit behind eyes. Sides of head scaled 7

5. Palatine teeth present. Hind lower preorbital spine hooked forward. Pre-dorsal scales reaching to eye *Parascorpaena picta*
 No palatine teeth 6
6. A pit below eye. Back gibbous. Interorbital space much more than eye diameter and without distinct ridges *Scorpaenopsis gibbosa*
 No pit below eye. Interorbital space much less than eye diameter and with two ridges uniting behind *Scorpaenopsis cirrhosa*
7. Strong coronal ridges and postfrontal spines present. A dark mark on opercle and a dark mark distally between 7th and 11th dorsal spines *Sebastapistes nuchalis*
 Coronal ridges feeble 8
8. Suborbital ridge with only one spine. 8th pectoral ray not reaching anal origin. Body with several yellowish white blotches *Sebastapistes strongia*
 Suborbital ridge with 2 or 3 spines. 8th pectoral ray slightly elongated, reaching to anal origin. Yellowish brown, mottled and marbled with dark brown; lower jaw with alternating white and brown bars *Sebastapistes oglinus*
9. 7 or 8 scales between base of fourth dorsal spine and lateral line. Coronal ridge with one spine. Suborbital ridge usually with 7 or 8 spines. Llat. about 50. Maxilla scaly. 4 or 5 reddish brown cross bands on sides *Scorpaenodes parvipinnis*
 5 or 6 scales between base of fourth dorsal spine and lateral line. Coronal ridge feeble. Not more than 4 suborbital spines. Llat. about 41. Body mottled with dark brown and white patches; a dark mark on opercle *Scorpaenodes guamensis*
10. Some of the upper pectoral rays with the exception of first one or two divided; no rays free from membrane. Pectoral not reaching caudal. Dorsal spines shorter than depth of body 11
 All pectoral rays simple; a few rays free from membrane and filamentous. Pectoral reaching caudal. Longest dorsal spines longer than depth of body 12
11. 45 to 48 rows of scales. Ventrals with 5 dark transverse bands *Dendrochirus brachypterus*
 50 rows of scales. Ventrals dark with some light spots near tip *Dendrochirus zebra*
12. Scales cycloid. Llat. more than 85. 10 or more scales between median dorsal spines and lateral line. 14 pectoral rays. Vertical fins with black spots. *Pterois volitans*
 Scales mostly ctenoid. Llat. less than 60. 7 or 8 scales between median dorsal spines and lateral line. 16 or more pectoral rays 13

13. Reddish with broad dark transverse bands on head and body. Vertical fins with small black spots. Orbital tentacle alternating with black and white *Pterois antennata*
 Reddish brown with 8 narrow white transverse stripes. Dorsal and anal whitish. Orbital tentacle pale *Pterois radiata*

532. **Taenianotus triacanthus** Lacépède

Taenianotus triacanthus Lacépède, Hist. Nat. Poissons, 4, p. 303, 1802. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 58, fig. 12, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, 21, p. 195, fig. 2b, 1970.

Taenianotus triacanthus Regan, Trans. Linn. Soc. London, 12 (3), p. 236, 1908. Smith and Smith, Fishes of Seychelles, p. 52, pl. 51, C, 1963.

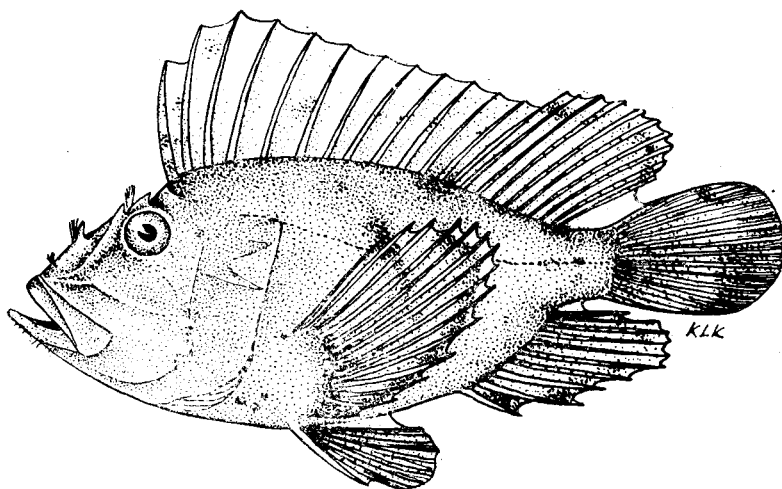


FIG. 532. *Taenianotus triacanthus* Lacépède, 38 mm. (after Jones and Kumaran)

Specimen studied: Kavarathi (1), 38 mm.

D. XII, 10; A. III, 7; P. 14; V. I, 5. LI. 23.

Head and body greatly compressed. Head 2.3 in standard length, 2.9 in total length. Depth of body 2.1 in standard length, 2.7 in total length. Eye 4.4 in head, 1.5 in snout and about 0.7 in concave interorbital space. Mouth oblique, maxillary reaching to below middle of eye. A cutaneous flap at anterior nostril and above eye. Hind border of preopercle with two blunt spines. Two ridges on opercle ending in small spines. A spine above hind quarter of eye and two spines below origin of dorsal. Soft dorsal connected by membrane to dorsal edge of caudal fin. First spine of dorsal slightly longer than postorbital part of head, second and third spines subequal, as long as head without snout.

Third anal spine longest, slightly shorter than first spine of dorsal. Pectoral slightly shorter than head, ventral equal to head without snout. Colour: Pale yellowish with irregular brown marking below 6th to 7th dorsal spines extending obliquely towards anal origin. Fins clear with some brown patches on first two spines of dorsal, distal part of soft rays, hind part of caudal, distal part of anal and tip of pectoral.

Distribution: East coast of Africa, Seychelles, Kavarathi in the Laccadives, Indonesia and Solomon, Marshall, Gilbert, Fiji, Samoan, Society, Tuamotu and Hawaiian Islands.

533. *Parascorpaena picta* (Cuvier)

Scorpaena picta Cuvier, in Cuvier and Valenciennes, Hist. Nat. Poissons, 4, p. 321, 1829.

Parascorpaena aurita Smith, Ichth. Bull., 4, p. 57, pl. II, C, 1957.

Parascorpaena bleekeri Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959.

Parascorpaena picta Muaro, Fishes of Ceylon, p. 248, pl. 48, fig. 722, 1955. de Beaufort, and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 7, fig. 2, 1962. Smith and Smith, Fishes of Seychelles, p. 54, pl. 50, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 140/447).

Scorpaena Bleekeri Day, Fishes of India, p. 747, 1878.

Scorpaena haplodactylus Day, Fishes of India, p. 149, pl. 36, fig. 2, 1878 (not of Bleeker).

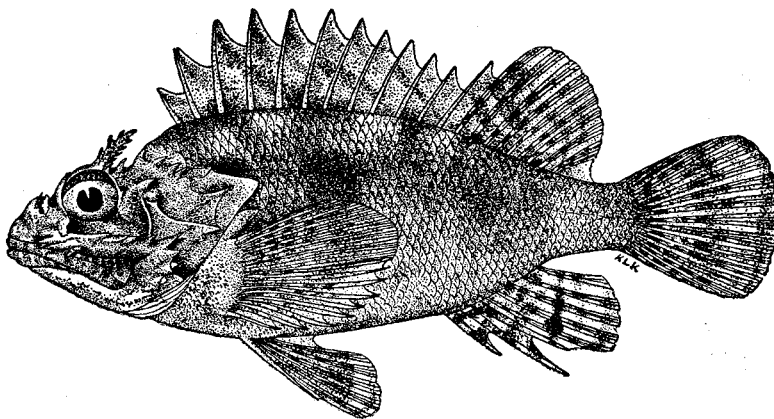


FIG. 533. *Parascorpaena picta* (Cuvier), 62 mm.

Specimens studied: Agathi (3), 68 to 73 mm. Ameni (1), 56 mm. Bitra (11), 33 to 65 mm. Kiltan (8), 34 to 80 mm. Minicoy (13), 38 to 85 mm.

D. XII (XIII), 9-10; A. III, 5; P. i, 5-6, 9-10; V. I, 5. Llat. 40-46; Ltr. 6-7+1+15-18.

Head 2.3-2.5 in standard length, 2.9-3.1 in total length. Depth of body 2.6-2.8 in standard length, 3.2-3.5 in total length. Eye 3.7-4.4 in head, equal

to snout and 0.5-0.7 in concave interorbital space. Maxillary reaching to slightly behind a level from hind border of eye. Villiform teeth in jaws and vomer and a few on palatines. Spines on head consisting of a small spine on the inner side of each anterior nostril, supraorbital ridge with 3 spines, postorbital ridge of 3 spines with a depression between the anterior pair of spines, two supraopercular spines, forwardly directed preorbital spine and another at its base and a small spine above it, suborbital ridge with 3 or 4 blunt spines ending in a strong preopercular spine and 4 small spines below on preopercle border. Small filaments along lower border of preorbital, preopercular and opercular edges, a long denticulated supraorbital tentacle and small filaments on lateral line. Supraorbital tentacle sometimes small or even absent. Pectoral equal to or a little shorter than head without snout, its upper 5 or 6 rays divided. Ventral slightly shorter than pectoral. Scales cycloid. Colour: Brownish, marbled with darker. Indistinct oblique bands and markings on dorsal and anal. Caudal with a dark band at base and another broad one in the centre and dark border narrowly edged with white. Indistinct bands on ventrals.

Local names: *Gauviha-mas* (Minicoy). *Peychan* (other islands).

Distribution: Seychelles, Zanzibar, Laccadives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, Indo-China and Fiji.

534. *Scorpaenopsis gibbosa* (Bloch and Schneider)

Scorpaena gibbosa Bloch and Schneider, Syst. Ichth., p. 192, pl. 44, 1801.

Scorpaenopsis gibbosa Smith, Ichth. Bull., 4, p. 59, pl. 4, E, 1957. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 21, 1962.

Smith and Smith, Fishes of Seychelles, p. 54, pl. 50, E, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 140/448).

Specimens studied: Agathi (3), 102 to 110 mm. Chetlat (2), 42 and 77 mm. Kalpeni (1), 78 mm. Minicoy (5), 75 to 150 mm.

D. XII, 9; A. III, 5; P. i, 4, 12-13 or i, 5, 12; V. I, 5. Ll. 35-37; Ltr. 8-9+1+18-19.

Head 2.3-2.5 in standard length, 2.7-3.0 in total length. Depth of body 2.6-2.9 in standard length, 3.1-3.6 in total length. Eye 5.8-6.8 in head, 1.6-2.0 in snout and 1.4-1.6 in concave interorbital space. Maxillary reaching to below hind border of eye or slightly beyond. Villiform teeth in bands in jaws, a few rows on vomer; palatines edentulous. Interorbital and most of the head naked, opercle and preopercle scaled. Anterior nostril with a flap. Spination of head consisting of 3 to 5 nasal spines, supraorbital ridge with strong spines, inferior and superior postorbital ridges with three spines each and a spine between the posteriormost spines of the above two ridges, 7 or 8 diverging spines on preorbital, 5 spines on suborbital, strong spines on preopercular border and two flat spines

on opercle. A deep groove below eye and above suborbital ridge. Some of the spines of head and scales with membraneous flaps. Third and fourth dorsal spines longest, about twice eye diameter. Pectoral as long as head without snout. Ventral slightly longer than postorbital length of head. Colour: Brownish, marbled with greenish brown. A broad brown area from base of median dorsal spine obliquely downwards to pectoral, a band from soft dorsal towards base of anal and another on caudal peduncle. Dorsal and anal with dark marmorations. Caudal with dark transverse band. Pectoral with basal and submarginal dark transverse areas and narrow dark vertical markings. Ventral with broad dark brown band in the middle, distal margin yellowish white.

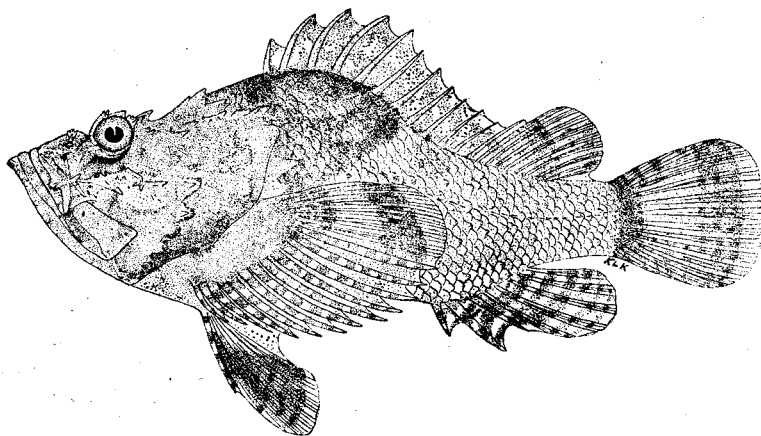


FIG. 534. *Scorpaenopsis gibbosa* (Bloch and Schneider), 150 mm.

Local names: *Gouviha-mas* (Minicoy). *Peychan* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Indonesia, Philippines, China, Ryukyus, Japan and Marshall, Fiji, Samoan, Society, Tuamotu and Marquesas Islands.

535. *Scorpaenopsis cirrhosa* (Thunberg)

Perca cirrhosa Thunberg, Svenska Vet. Akad. Handlingar, Stockholm, 14, p. 199, pl. 7, lower figure, 1793.

Scorpaenopsis cirrhosa Day, Fishes of India, p. 150, 1878. Smith, Fishes of Southern Africa, p. 371, pl. 85, fig. 1043, 1949. Smith, Ichth. Bull., 4, p. 60, pl. 4, B, 1957. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 15, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 140/449).

Scorpaenopsis cirrhosus Munro, Fishes of Ceylon, p. 247, pl. 47, fig. 716, 1955.

Specimen studied: Kavarathi (1), 117 mm.

D. XII, 9; A. III, 5. P. i, 5, 11; V. I, 5. Ll. 44; Ltr. 7+1+16.

Head 2.60 in standard length, 3.25 in total length. Depth of body 2.8 in standard length, 3.5 in total length. Eye 5.0 in head, 1.6 in snout and 0.7 in deep interorbital space. Maxillary reaching to below hind border of iris. Teeth in villiform bands in jaws and on vomer; palatines edentulous. Head

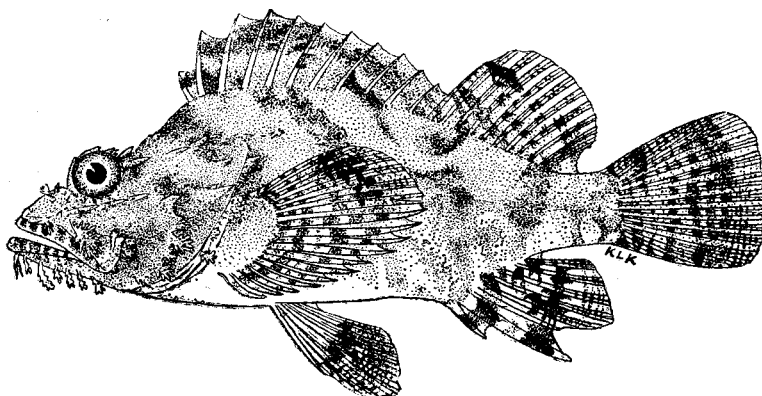


FIG. 535. *Scorpaenopsis cirrhosa* (Thunberg), 117 mm.

except opercle and preopercle naked. A deep notch before eye continued as a groove below eye on each side above suborbital ridge. Anterior nostril with a membranous flap. A median ridge from between hind nostrils ending in interorbital space and a low ridge on each side in between supraorbital ridges almost meeting just at the level of the hind border of eyes. A moderate transverse pit in front of the scaled occiput. A spine near anterior nostril, supraorbital ridge with 3 spines and a short spine near the third, superior and inferior postorbital ridges with 3 spines each and a spine in between the last two, a spine above the shoulder girdle, preorbital with 2 spines, the anterior one directed forwards and the hind one directed backwards and downwards; the hind border of preopercle with 4 spines and two divergent spines on the opercle. Membranous flaps present below lower jaw, border of preopercle, opercle, upper jaw and some spines of the head and some of the scales of body. Fourth dorsal spine longest, 1.5 eye diameter. Second anal spine longer and stronger than the third, slightly more than twice eye diameter. Pectoral as long as head without snout. Ventral slightly shorter than pectoral. Colour: Brownish with reddish tinge, marbled with greenish brown and dark. Dorsal and anal marmorate with greenish brown band; pectoral with brown vertical bars and mottling, tips of rays scarlet; distal half of ventral marbled with dark brown.

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Ryukyu Islands, Japan and eastwards to Society Islands.

536. *Sebastapistes nuchalis* (Günther)

Scorpaena nuchalis Günther, Fische der Sudsee, 1, p. 76, 1874.

Sebastapistes nuchalis Smith, Ichth. Bull., 4, p. 54, pl. II, B, 1957. Jones and Kumaran, J. Mar. biol. Ass. India, 7, p. 120, fig. 16, 1965. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 140/450).

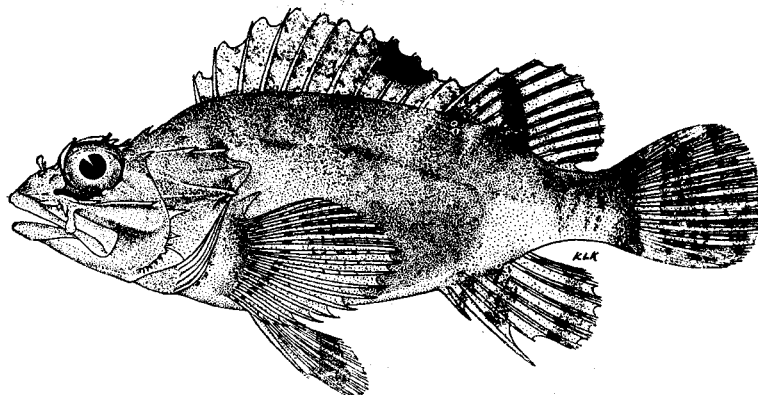


FIG. 536 a. *Sebastapistes nuchalis* (Günther), 47 mm. (after Jones and Kumaran)

Specimens studied: Bitra (6), 33 to 40 mm. Chetlat (8), 26 to 70 mm. Kalpeni (22), 34 to 55 mm. Kavarathi (4), 30 to 57 mm. Kiltan (23), 30 to 56 mm. Minicoy (17), 32 to 60 mm.

D. XII, 9; A. III, 5; P. i, 6, 10 or i, 5, 11 or i, 4, 11; V. I, 5. Llat. 41-43; Ltr. 6+1+12-13.

Head 2.3-2.4 in standard length, 3.0-3.1 in total length. Depth of body 2.7-2.8 in standard length, 3.5-3.6 in total length. Eye 3.7-4.0 in head, equal to snout and about 0.6 in concave interorbital space. Maxillary reaching to below hind margin of eye. Teeth in villiform bands in jaws, vomer and palatines. Interorbital ridges strong and well developed. Spination consisting of one near anterior nostril, supraorbital ridge with 3 spines, one postfrontal spine, superior postorbital ridge with 3 spines, inferior postorbital ridge with 4 spines, a spine in between the last two spines of the above two ridges, preorbital with one spine directed forwards anteriorly and two retrorse spines posteriorly, suborbital ridge ending posteriorly in one small spine, preopercle with 5 or 6 spines, opercle with two flat spines and one on upper part of shoulder girdle. Small filaments at anterior nostril, supraorbital and preorbital spines and along preopercle margin. Pectoral equal to head without snout or shorter, ventral slightly shorter. Colour: Somewhat yellowish, marbled with brown. A dark mark on opercle. Dorsal light brownish with obscure dark markings, a dark brown mark between 7th and 11th dorsal spines distally. Anal yellowish with dark oblique markings. Cau-

dal yellowish with broad light brownish markings at base and in the middle. Pectoral yellowish with 5 or 6 rows of dark brown spots. Ventral light with dusky mark in the middle.

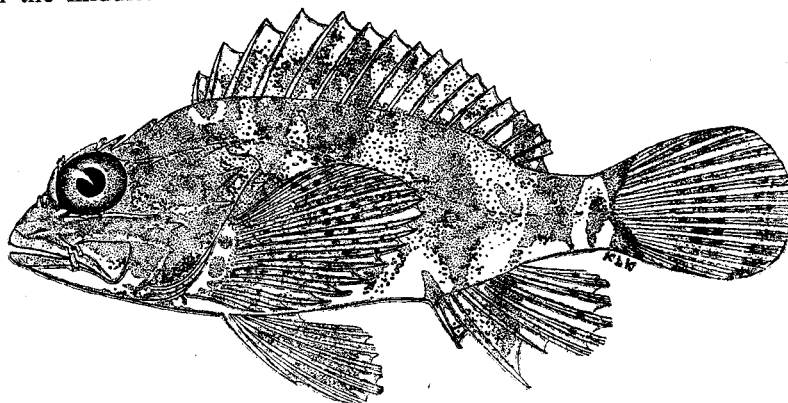


FIG. 536 b. *Sebastapistes nuchalis* (Günther), 35 mm.

Local names: *Gauviha-mas* (Minicoy). *Bara-peychan*, *Peychan* (other islands).

Distribution: East coast of Africa and neighbouring islands, Seychelles, Laccadives, Philippines and Rotuma, Rarotonga and Hawaiian Islands in the Pacific.

Note: A specimen, which appears to be abnormal, is present in our collection (fig. 536 b). It has 17 spines in the dorsal. The fifth dorsal spine is the longest and subsequent spines decrease gradually in size and there are no soft rays. All other characters agree with those of the normal specimens of *S. nuchalis*.

537. *Sebastapistes strongia* (Cuvier)

Scorpaena strongia Cuvier, in Cuvier and Valenciennes, Hist. Nat. Poissons, 4, p. 323, 1829.

Scorpaena kowiensis Smith, Rec. Alb. Mus., p. 224, 1936.

Sebastapistes kowiensis Smith, Ichth. Bull., 4, p. 54, pl. II, D, 1957.

Sebastapistes strongia Munro, Fishes of Ceylon, p. 248, pl. 47, fig. 719, 1955. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, II, p. 24, fig. 4, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 140/451).

Specimens studied: Chetlat (3), 23 to 35 mm. Kavarathi (4), 41 to 56 mm. Minicoy (18), 32 to 62 mm.

D. XII, 9-10; A. III, 5; P. i, 5, 10 or i, 6, 10; V. I, 5. Llat. 46-48; Ltr. 6-7+1+13-15.

Head 2.3-2.5 in standard length, 2.9-3.2 in total length. Depth of body 2.4-2.7 in standard length, 3.1-3.4 in total length. Eye 3.3-3.6 in head, equal

to snout and about 0.5-0.6 in concave interorbital space. Maxillary reaching to below hind border of pupil or a little beyond. Villiform teeth on jaws, vomer and palatines. No filaments on head or body except a small flap at anterior nostril. Spination on head consisting of one small spine near anterior nostril, supraorbital ridge with three spines, superior postorbital ridge with 3 spines, inferior postorbital ridge with 4 spines, a spine posteriorly in between the two postorbital ridges, preorbital with one spine directed forwards and 3 spines directed backwards, the anterior one or two flaring slightly outwards, suborbital ridge ending posteriorly in a small spine, preopercle with 5 spines and opercle with two flat spines and a strong spine on upper side of shoulder girdle. Pectoral equal to head without snout, ventral a little shorter. Colour: Reddish brown with irregular yellowish white blotches on body. Head and anterior part of body densely covered with minute yellowish spots. Fins brownish, posterior parts of dorsal and anal pale yellowish.

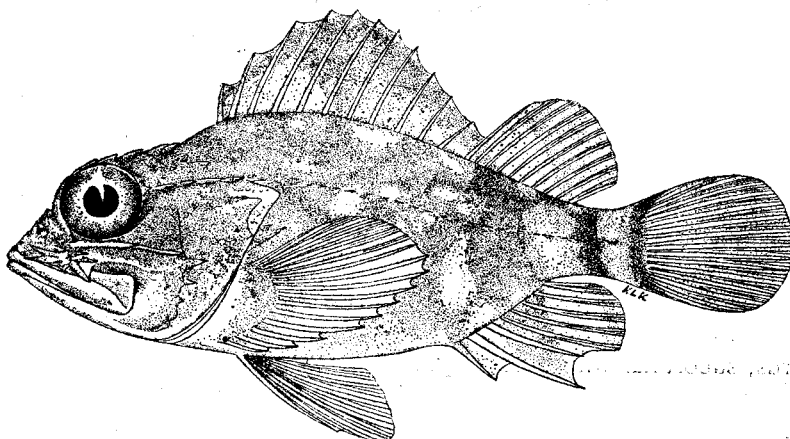


FIG. 537. *Sebastapistes strongia* (Cuvier), 47 mm.

Local names: *Gauviha-mas* (Minicoy). *Peychan* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Ceylon, Indonesia, Philippines, New Hebrides, Samoa and Australia.

538. *Sebastapistes oglinus* (Smith)

Kantapus oglinus Smith, Ann. Mag. Nat. Hist., (11) 13, p. 817, 1946. Smith, Fishes of Southern Africa, p. 369, fig. 1035, 1949.

Sebastapistes oglinus Smith, Ichth. Bull., 4, p. 55, pl. III, B and C, 1957. Smith and Smith, Fishes of Seychelles, p. 54, pl. 48, C, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 140/452).

Specimens studied: Minicoy (3), 31 to 44 mm.

D. XII, 8-9; A. III, 5; P. i, 5, 9; V. I, 5. Ll. 22; Ltr. 7+1+11.

Head 2.3 in standard length, 3.0 in total length. Depth of body 2.5-2.6 in standard length, 3.2-3.3 in total length. Eye 3.8-4.0 in head, 1.0-1.1 in snout and 0.6 in interorbital space. Maxillary reaching to below hind border of eye. Villiform teeth in bands in jaws, in an angular band on vomer and in narrow

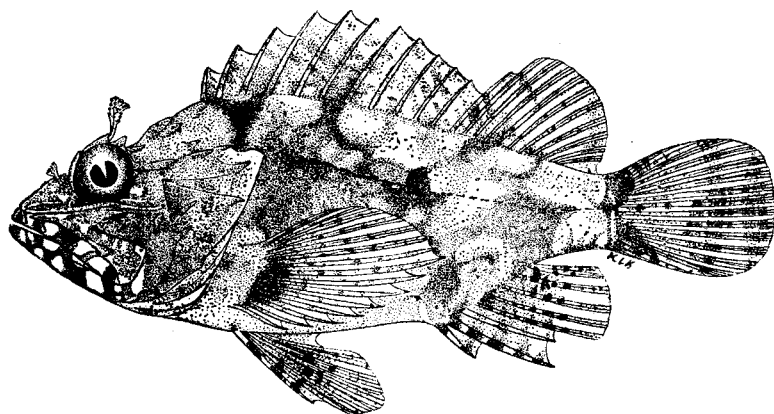


FIG. 538. *Sebastapistes oglinus* (Smith), 44 mm.

bands on palatines. Head except upper part of opercle naked. Predorsal scales ending at nuchal spine. Spination on head consisting of one near anterior nostril; three supraorbital spines; two postorbital spines with a moderate depression between them; two pterotic and two post-temporal spines; preorbital with a forwardly directed spine anteriorly and the hind one directed downwards and backwards; suborbital with 2 or 3 spines; preopercle with 5 blunt spines; opercle with two flat spines and shoulder girdle with one spine. Small multifid nostril at anterior nostril. Filaments at preopercular margin and a small denticulated orbital tentacle. Pectoral shorter than head, 8th ray longest, reaching origin of anal fin. In the smallest specimen, all pectoral rays simple. Ventral shorter than pectoral. Colour: Yellowish brown, mottled and marbled with dark brown, lower jaw with alternating brown and white bars. Fins marbled with dark brown; midbase of pectoral with a dark blotch; anal and ventral darker than other fins.

Distribution: East coast of South Africa to Seychelles in the Western Indian Ocean and Laccadives in the Central Indian Ocean.

539. *Scorpaenodes parvipinnis* (Garrett)

Scorpaena parvipinnis Garrett, Proc. California Acad. Sci., p. 105, 1863.

Paronescodes asperrimus Smith, Ichth. Bull., 12, p. 177, 1958. Smith and Smith, Fishes of Seychelles, p. 54, pl. 48, E, 1963.

Scorpaenodes parvipinnis Smith, Ichth. Bull., 4, p. 67, pl. 1, A and B, 1957. Jones and Kumaran, J. Mar. biol. Ass. India, 9, p. 12, fig. 13, 1967. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 28, 1969 (Cat. No. CMFRI-LA-F. 140/453).

Specimens studied: Agathi (1), 68 mm. Minicoy (1), 48 mm.

D. XIII, 9; A. III, 5; P. i, 7, 10 or ii, 8, 9; V. I, 5. Ll. 26-27; Llat. 50; Ltr. 7-8+1+14-15.

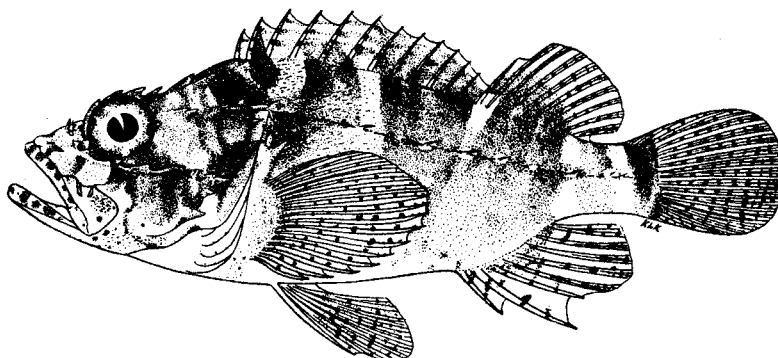


FIG. 539. *Scorpaenodes parvipinnis* (Garrett), 68 mm. (after Jones and Kumaran)

Head 2.3-2.4 in standard length, 2.9-3.1 in total length. Depth of body 2.7-2.8 in standard length, 3.4-3.5 in total length. Eye 3.6 in head, equal to snout and 0.6 in concave interorbital space. Maxillary reaching to below hind border of iris. One spine near anterior nostril, a preocular spine, a supraorbital ridge of 3 or 4 spines, coronal ridges short but ending posteriorly in a spine, one postfrontal spine, 2 spines on superior postorbital ridge, 4 spines on inferior postorbital ridge, suborbital with 7 or 8 spines, 3 spines on hind border of preopercle, 2 opercular spines and one spine on shoulder girdle. Anterior nostril with a multifid flap. Lower margin of preopercle and some scales of head and body with small cirri. Flaps present on preorbital. Fourth or fifth dorsal spine longest, almost equal to eye diameter; last dorsal spine longer than penultimate spine; second anal spine longer and stronger than third, about $1\frac{1}{2}$ eye diameter. Chin naked; maxilla, preopercle, opercle and snout scaled, those on snout minute. Bases of fins scaled. Occipital pit only slightly developed. Teeth in bands in jaws and in an angular patch on vomer, palatines edentulous. Colour: Pinkish, lower side lighter; lips barred with brown spots; 4 or 5 reddish brown vertical bands on sides of body, all bands except the last extending on to basal half of dorsal fin and small greenish brown spots on lower part of head. Fins yellowish with reddish brown spots on rays.

Distribution: East coast of South Africa and neighbouring islands of Aldabra, Assumption and Seychelles in the Western Indian Ocean, Laccadives in the Central Indian Ocean and Marshall, Samoan and Hawaiian Islands in the Pacific.

540. *Scorpaenodes guamensis* (Quoy and Gaimard)

Scorpaena guamensis Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 326, 1824.

Scorpaenodes guamensis Smith, Fishes of Southern Africa, p. 372, fig. 1044 a, 1949. Munro, Fishes of Ceylon, p. 246, pl. 47, fig. 714, 1955. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **11**, p. 31, fig. 6, 1962. Palmer, Ann. Mag. Nat. Hist., **5** (13), p. 502, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 29, 1969 (Cat. No. CMFRI-LA-F. 140/454).

Scorpaenopsis guamensis Day, Fishes of India, p. 150, 1878.

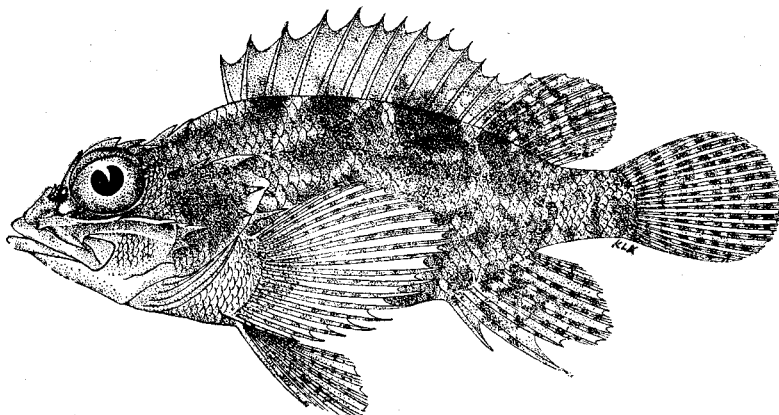


FIG. 540. *Scorpaenodes guamensis* (Quoy and Gaimard), 65 mm.

Specimens studied: Bitra (1), 57 mm. Chetlat (3), 35 to 63 mm. Kadamat (1), 46 mm. Kavarathi (1), 65 mm. Kalpeni (3), 45 to 56 mm. Kiltan (3), 35 to 65 mm. Minicoy (6), 33 to 49 mm.

D. XIII, 8-9; A. III, 5-6; P. i, 6, 11 or i, 7, 10; V. I, 5. Llat. 40-41; Ltr. 5-6+1+13-14.

Head 2.2-2.4 in standard length, 2.9-3.1 in total length. Depth of body 2.6-2.9 in standard length, 3.3-3.7 in total length. Eye 3.4-3.9 in head, equal to or a little more than snout and 0.5-0.6 in concave interorbital space. Maxillary reaching to somewhat below hind border of eye. Teeth in villiform bands in jaws and on vomer, none on palatines. Head scaled, those on interorbital space, below eye and on snout very small. Anterior nostril with a small flap. Small filaments often present near one or two supraorbital spines. Spination on head consisting of a small spine dorsolateral to anterior nostril, supraorbital ridge with 4 spines, 2 spines on superior postorbital ridge, three spines on inferior postorbital ridge, a preorbital spine present and suborbital usually with 3 spines, 3 or 4 spines on hind border of preopercle, two opercular spines and one superiorly on shoulder girdle. Pectoral equal to head without snout, ventral shorter. Colour: Brownish, marbled with dark brown spots and white patches. All fins mottled with dark brown, intermingled with light areas.

Local names: *Gauviha-mas* (Minicoy). *Peychan* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines and Palau, Caroline, New Hebrides, Guam, Fiji, Samoan, Phoenix and Society Islands and Australia.

541. *Dendrochirus brachypterus* (Cuvier)

Pterois brachyptera Cuvier, in Cuvier and Valenciennes, Hist. Nat. Poissons, 4, p. 368, 1829. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 49, 1962.

Dendrochirus brachyptera Palmer, J. Bombay nat. Hist. Soc., 55, p. 489, 1958.

Dendrochirus brachypterus Smith, Fishes of Southern Africa, p. 374, pl. 102, fig. 1050, 1949. Smith, Ichth. Bull., 5, p. 82, pl. 6, B, 1957. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 140/455).

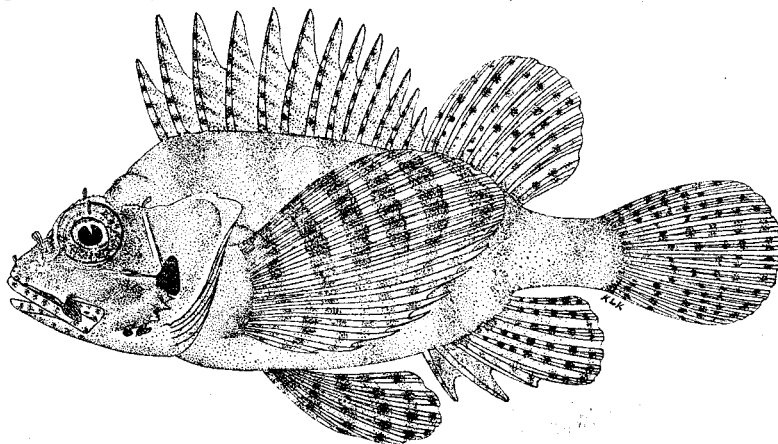


FIG. 541. *Dendrochirus brachypterus* (Cuvier), 66 mm.

Specimens studied: Agathi (2), 52 and 56 mm. Chetlat (1), 42 mm. Kavarathi (2), 44 and 66 mm. Minicoy (1), 45 mm.

D. XIII, 10; A. III, 6; P. i, 8, 8; V. I, 5. Llat. 45-48; Ltr. 6+1+12-13.

Head 2.5-2.6 in standard length, 3.3-3.4 in total length. Depth of body 2.4-2.5 in standard length, 3.2-3.3 in total length. Eye 3.5-3.6 in head, equal to or a little more than snout and about 0.7 in concave interorbital space. Maxillary reaching to about below hind border of pupil. Villiform teeth in jaws and on vomer. Spination consisting of a short spine between nostrils, supra-orbital ridge with 5 or 6 spines, inferior postorbital ridge with several spines, interorbital ridge well developed and connected posteriorly by a transverse ridge and continued to the superior postorbital ridges, suborbital ridge with several small spines, preorbital with 2 or 3 blunt spines, preopercle with 3 spines and a feebly developed flat opercular spine. 5th to 7th dorsal spines longer than

others. Pectoral slightly longer than head, ventral a little shorter. Filaments on snout, above eye and on preopercle margin and a flap at anterior nostril. Colour: Brownish with indistinct dark transverse bands. Spinous dorsal brownish with dark spots on spines. Soft dorsal, anal and caudal light with dark spots. Pectoral with 6 or 7 broad dark transverse bands above, lower sides with dark spots. Ventral with 5 dark transverse bands.

Local names: *Fang-hamas* (Minicoy). *Chavarali* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, Indonesia, Philippines and Fiji, Samoan and Hawaiian Islands and Australia.

542. *Dendrochirus zebra* (Quoy and Gaimard)

Pterois zebra Quoy and Gaimard, Voy. *Uranie*, Zoologie, p. 329, 1824. Day, Fishes of India, p. 153, 1878. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 47, 1962. Regan, in Gardiner, J. S., The fauna and geography of the Maldive and Laccadive Archipelagoes, 1, p. 274, 1903. Regan, Trans. Linn. Soc. London, 12 (3), p. 236, 1908.

Dendrochirus zebra Munro, Fishes of Ceylon, p. 245, pl. 47, fig. 710, 1955. Smith, Fishes of Southern Africa, p. 374, 1961.

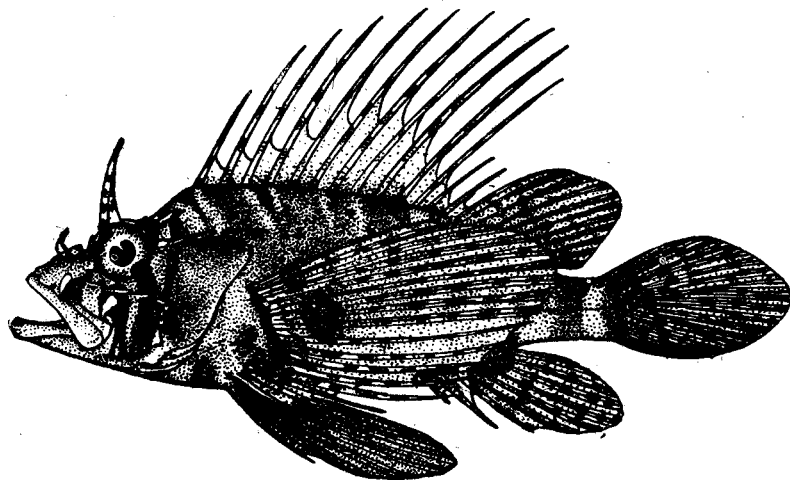


FIG. 542. *Dendrochirus zebra* (Quoy and Gaimard), 86 mm.

Specimen studied: Minicoy (1), 86 mm.

D. XIII, 11; A. III, 6; P. i, 8, 8; V. I, 5. Ll. 51; Ltr. 8+1+14.

Head 2.6 in standard length, 3.3 in total length. Depth of body 2.8 in standard length, 3.5 in total length. Eye 3.6 in head, equal to snout and 0.6 in concave interorbital space. Maxillary reaching to below front border of pupil. Jaws and vomer with villiform teeth. Anterior nostril with a flap. Orbital tentacle about half length of head. A short spine between nostrils, supraorbital

ridge with five spines, inferior postorbital ridge with six spines, interorbital ridge diverging behind eyes and continued as superior postorbital ridges with four spines; suborbital ridge with small spines, preoperculum with three spines and operculum with a flat spine. First dorsal spine as long as eye, 8th dorsal spine slightly longer than head. Uppermost ray of pectoral and eight lower rays of pectoral simple, others deeply forked; membrane of lower rays only deeply incised. Pectoral reaching to caudal peduncle. Ventral equal to head. Colour: Reddish brown, sides with eight dark brown transverse bands; two dark brown bands from eye to cheek and another on occiput. Median fins hyaline, spines and rays with dark brown spots. Pectoral membrane dark brown, rays whitish with transverse dark brown bands. Ventral fin brown with some light spots distally.

Distribution: East coast of Africa, Mauritius, Minicoy in the Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines, China and Palau, Fiji, Samoan, Gilbert and Hawaiian Islands and Queensland.

543. *Pterois volitans* (Linnaeus)

Gasterosteus volitans Linnaeus, Syst. Nat., ed. 10, p. 296, 1758.

Pterois miles Day, Fishes of India, p. 153, pl. 37, fig. 2, 1878. Smith, Fishes of Southern Africa, p. 508, 1949. Munro, Fishes of Ceylon, p. 246, pl. 47, fig. 713, 1955.

Pterois volitans Day, Fishes of India, p. 154, pl. 37, fig. 1, 1878. Regan, Trans. Linn. Soc. London, 12 (3), p. 236, 1908. Smith, Fishes of Southern Africa, p. 373, fig. 1047, 1949. Munro, Fishes of Ceylon, p. 245, pl. 47, fig. 711, 1955. Smith, Ichth., Bull., 5, p. 76, pl. 5, A-D, 1957. Balan, J. Bombay nat. Hist. Soc., 55, p. 302, 1958. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 39, fig. 8, 1962. Palmer, Ann. Mag. Nat. Hist., 5 (13), p. 502, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 140/456).

Specimens studied: Agathi (7), 65 to 255 mm. Ameni (1), 68 mm. Chetlat (6), 43 to 110 mm. Kavarathi (5), 98 to 150 mm. Kiltan (2), 130 and 175 mm. Minicoy (9), 32 to 212 mm.

D. XIII, 10-11; A. III, 6-7; P. 14; V. I, 5. Llat. 85-102; Ltr. 10-13 +1+21-24.

Head 2.6-2.8 in standard length, 3.5-3.9 in total length. Depth of body 2.7-3.0 in standard length, 3.7-4.1 in total length. Eye 4.0-4.8 in head, 1.5-1.8 in snout and equal to or slightly more than highly concave interorbital space. Maxillary reaching to nearly below anterior third of eye. Villiform teeth in jaws and on vomer. Interorbital space and nape without scales. Spinacion on head highly variable; generally consisting of one spine near anterior nostril, supraorbital ridge with 2 spines, superior postorbital ridge with 2 or occasionally 3 spines, 3 or 4 spines on inferior postorbital ridge, suborbital with several irregular small spines, 3 blunt spines on preopercle edge and a flat opercular spine. Filaments on front of snout, on preorbital, on snout and preopercle mar-

gin and a long supraorbital tentacle. Length of pectoral varying with age and reaching to caudal base or beyond. All rays of pectoral simple. Ventral longer than head. Colour: Reddish with numerous dark brown cross bars and narrower pale interspaces. Dorsal, anal and caudal with black spots. Pectoral brownish with a few blackish spots. Ventral dark brown with small pearly spots and blackish markings.

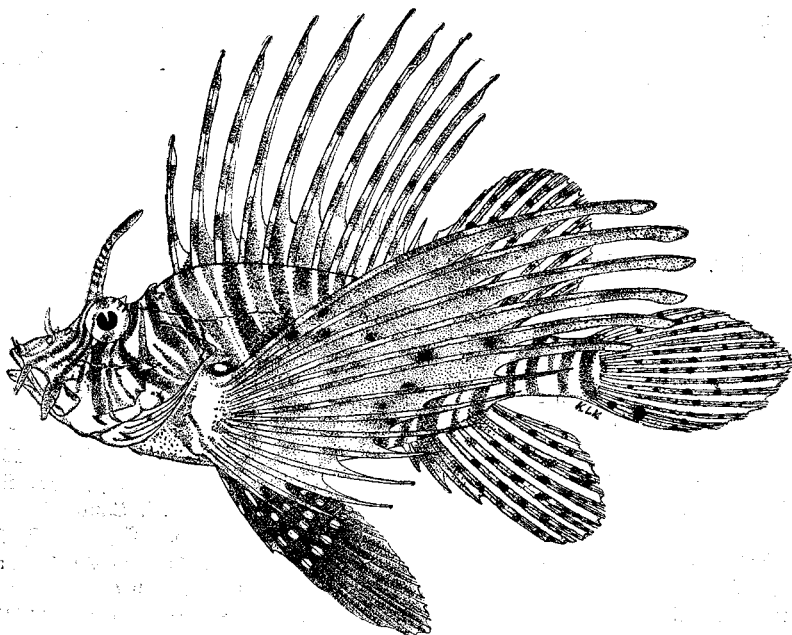


FIG. 543. *Pterois volitans* (Linnaeus), 130 mm.

Local names: *Fang-hamas* (Minicoy). *Phanhu-kuthi*, *Chavarali* (other islands).

Distribution: East coast of Africa, Red Sea, Persian Gulf, Laccadives, Maldives, India, Ceylon, Malaysia, Indonesia, Philippines, Ryukyus, Japan, China and Samoan, Society, Marquesas and Tuamotu Islands and Australia.

544. *Pterois antennata* (Bloch)

Scorpaena antennata Bloch, Naturges. Ausl nd Fische, 3, p. 21, pl. 185, 1787.

Pterois antennata Smith, Fishes of Southern Africa, p. 508, pl. 102, fig. 1046 a, 1949. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 45, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 140/457).

Pteropterus antennata Smith, Ichth. Bull., 5, p. 79, pl. 5, F, 1957. Smith and Smith, Fishes of Seychelles, p. 54, pl. 49, F, and pl. 97, B, 1963.

Specimen studied: Kavarathi (1), 63 mm.

D. XIII, 11; A. III, 7; P. 19; V. I, 5. Llat. 52; Ltr. 7+1+17.

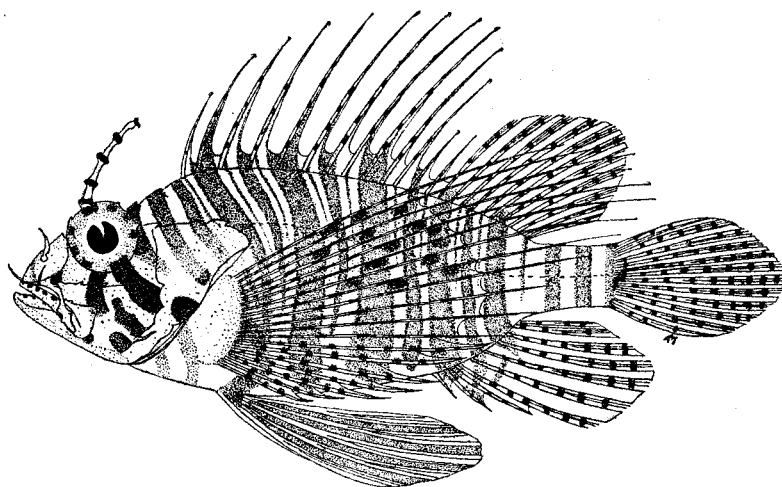


FIG. 544. *Pterois antennata* (Bloch), 63 mm.

Head 2.6 in standard length, 3.4 in total length. Depth of body 2.7 in standard length, 3.5 in total length. Profile of snout deeply notched. Head 3.2 in head, 0.8 in snout and about 0.6 in interorbital space. Maxillary reaching almost to below middle of eye. Villiform teeth in jaws and on vomer. One spine behind anterior nostril, supraorbital ridge with 2 spines, superior postorbital ridge with 3 spines, inferior postorbital ridge with 4 small spines and 2 larger spines, suborbital ridge with 5 spines, and 3 blunt preopercular spines. Seventh dorsal spine longest, slightly shorter than head; last two dorsal spines subequal, a little more than one eye diameter. Supraorbital tentacle with black lateral flaps, about $1\frac{1}{2}$ eye diameter in length. Anterior nostril with a flap and flaps at tip of snout, suborbital and lower edge of preoperculum. Longest rays of pectoral reaching beyond base of caudal. Ventral about half length of snout shorter than head. Predorsal scales reaching to hind border of eye; interorbital, snout, chin and margin of preopercle naked, rest of the head with small scales. Colour: Reddish brown with broad dark transverse bands on head and body; the dark band from eye to angle of preopercle more prominent. Orbital tentacle alternating with white and black. Dorsal, anal and caudal yellowish with small black spots on rays. Pectoral bluish brown with large dark blotches. Ventral dark bluish brown.

Distribution: East coast of Africa, Arabia, Laccadives, coasts of India, Indonesia, Philippines, China and Mariana, New Hebrides, Tuamotu and Marquesas Islands.

545. *Pterois radiata* Cuvier

Pterois radiata Cuvier, in Cuvier and Valenciennes, Hist. Nat. Poissons, 4, p. 369, 1829.
de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 47, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 140/458).

Pterois cincta Day, Fishes of India, p. 154, pl. 37, fig. 3, 1878.

Pteropterus radiata Smith, Ichth. Bull., 5, p. 79, pl. 5, E, 1957.

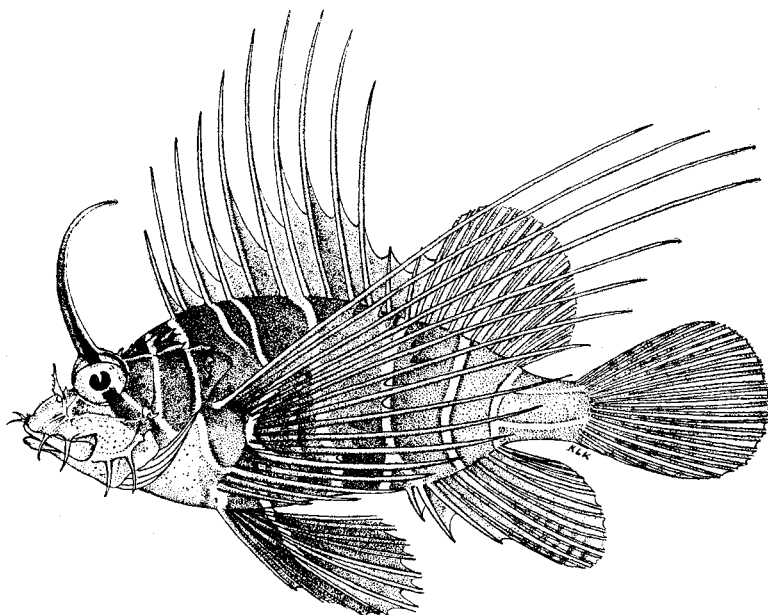


FIG. 545. *Pterois radiata* Cuvier, 85 mm.

Specimens studied: Kavarathi (2), 82 and 85 mm. Minicoy (1), 110 mm.

D. XII, 11; A. III, 6; P. 16; V. I, 5. Llat. 50-53; Ltr. 7-8+1+11-14.

Head equal to depth of body, 2.5-2.7 in standard length, 3.3-3.5 in total length. Eye 3.6-3.7 in head, equal to snout and 0.8 in concave interorbital space. Maxillary reaching to below middle of eye. Villiform teeth in jaws and on vomer. Spination consisting of one behind anterior nostril, supraorbital ridge with three spines, interorbital ridges ending posteriorly in postfrontal spines, superior postorbital ridge with 3 spines, inferior postorbital ridge with 5 or 6 spines, suborbital ridge with several small spines, preoperculum with 3 spines and a large flat opercular spine. Tentacles on preopercle, lower margin of preorbital and smaller ones on snout; anterior nostril with a small flap and a fleshy tentacle above eye. Pectoral reaching to end of caudal. Ventral equal to head. Colour: Reddish brown with 8 narrow white transverse lines, two below posterior dorsal spines being bifurcated above and below and two longitudinal

white lines on caudal peduncle being joined anteriorly to the last transverse line. A deep brown band through eye to angle of preopercle. Dorsal and anal whitish, base a little darker. Caudal white, rays spotted. Basal part of pectoral brownish with two whitish lines, rays white. Ventral brownish with one white line.

Local names: *Fang-hamas* (Minicoy). *Chavarali* (other islands).

Distribution: East coast of South Africa, Red Sea, Laccadives, Andamans and Sipora, Marshall, Gilbert, Ellice, Tonga, Cook, Society, Tuamotu, Marquesas and Hawaiian Islands.

Family CARACANTHIDAE

Body ovate, compressed. Mouth small, oblique; teeth villiform in narrow bands in jaws. Vomer and palatines edentulous. Preopercle, opercle and pre-orbital spinate. Dorsal with pungent spines, soft fin with deeply forked rays. Two anal spines, short and pungent. Ventrals rudimentary with a spine and two or three rays. Gill openings restricted. Gill membranes attached to isthmus. No scales; head, body and tail covered with short dermal papillae.

Membrane between spinous and soft parts of dorsal hardly notched. Light brownish to bluish on back, grey below *Caracanthus unipinnus*

Membrane between spinous and soft parts of dorsal deeply notched. Brown, lighter below with greenish grey to scarlet spots on head, body and tail *Caracanthus maculatus*

546. *Caracanthus unipinnus* (Gray)

Micropus unipinna Gray, Zoological Miscellany, p. 20, 1831.

Amphiprionichthys zeylonicus Day, Fishes of India, p. 158, pl. 38, fig. 6, 1878.

Caracanthus unipinna Regan, Trans. Linn. Soc. London, 12 (3), p. 237, 1908. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 169, fig. 40, 1962.

Caracanthus unipinnus Smith, Ichth. Bull., 12, p. 172, pl. 8, F, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 142/459).

Caracanthus zeylonicus Smith, Fishes of Southern Africa, p. 375, pl. 83, fig. 1053, 1949. Munro, Fishes of Ceylon, p. 250, pl. 48, fig. 725, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959.

Specimens studied: Agathi (8), 25 to 33 mm. Minicoy (19), 20 to 34 mm.

D. VII-VIII; 13-14; A. II, 11-12; P. 12-13; V. I, 3.

Head and body greatly compressed, dorsal profile of head very steep. Head 2.4-2.8 in standard length, 3.0-3.4 in total length. Depth of body 1.7-2.0 in standard length, 2.1-2.4 in total length. Eye 4.3-5.2 in head, 1.0-1.3 in

snout and 0.6-0.7 in interorbital space. A narrow band of villiform teeth in jaws. Vomer and palatines edentulous. Preorbital with a short almost forwardly directed spine anteriorly and a longer spine directed obliquely downwards. Preopercle with 5 or 6 blunt spines, interopercle with a spine and opercle with 2 blunt spines. Membrane between spinous and soft part of dorsal fin hardly notched. Third or fourth spine of dorsal longest, slightly longer than eye diameter. Middle rays of dorsal longer than longest dorsal spine. Anal spines very short, rays much shorter than those of dorsal. Pectoral equal to or shorter than postorbital part of head. Ventrals rudimentary. Head and body thickly covered with minute papillae. Colour: Light brownish to bluish on back, grey below. Fins pale, dorsal and caudal sometimes light brownish.

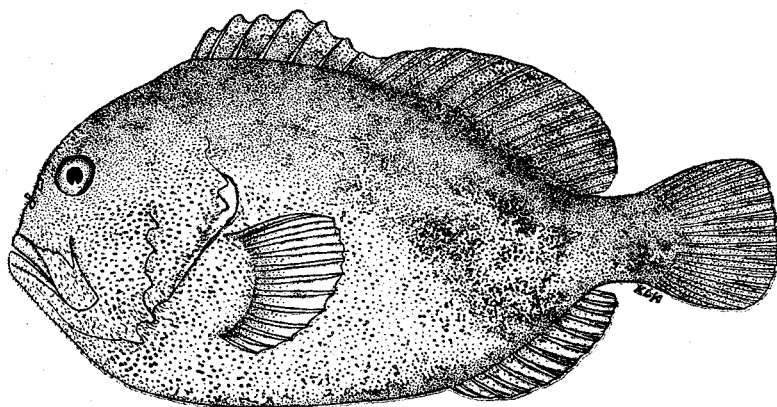


FIG. 546. *Caracanthus unipinnus* (Gray), 33 mm.

Distribution: East coast of Africa, Laccadives, Maldives, India, Ceylon, Indonesia, Philippines and Marshall, Gilbert, Fiji, Samoan, Society, Tuamotu and Hawaiian Islands.

547. *Caracanthus maculatus* (Gray)

Micropus maculatus Gray, Zoological Miscellany, p. 20, 1831.

Caracanthus maculatus Smith, Ichth. Bull., 12, p. 172, pl. 8, G, 1958. Regan, Trans. Linn. Soc. London, 12 (3), p. 237, 1908. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 171, 1962. Smith and Smith, Fishes of Seychelles, p. 54, pl. 52, G and pl. 97, A, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 142/460).

Specimens studied: Minicoy (5), 27 to 33 mm.

D. VII-VIII, 12-13; A. II, 12; P. 13; V. I, 3.

Head and body highly compressed, dorsal profile of head steeply convex. Head 2.3-2.6 in standard length, 2.7-3.1 in total length. Depth of body 1.7-2.0 in standard length, 2.1-2.3 in total length. Eye 4.0-4.6 in head, 0.8-1.1 in snout

and 0.7-0.8 in interorbital space. Maxillary reaching to below hind border of iris. A narrow band of villiform teeth in jaws. Vomer and palatines edentulous. Preorbital with a blunt point anteriorly and a downwardly directed flat spine behind. Preopercle with five blunt spines; interopercle with a spine and opercle with two blunt spines. Third or fourth dorsal spine longest; membrane between last dorsal spine and first dorsal ray notched. Pectoral equal to or shorter than postorbital length of head. Ventrals rudimentary. Head and body with minute papillae. Colour: Brown, lighter below with greenish grey to scarlet spots on head, body and tail. Fins pale.

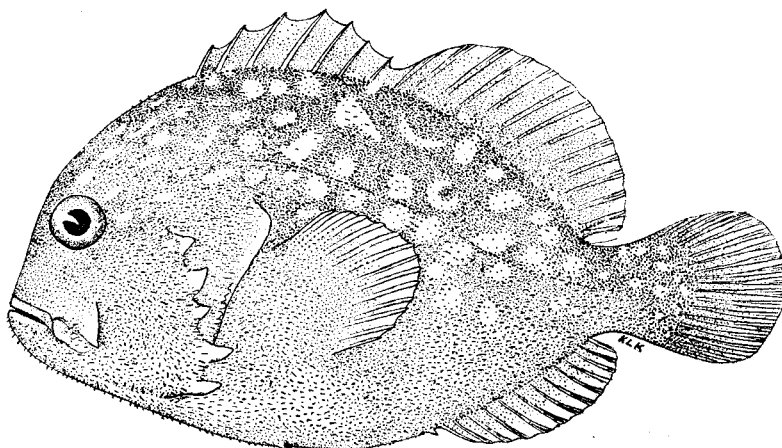


FIG. 547. *Caracanthus maculatus* (Gray), 33 mm.

Distribution: East coast of Africa, Seychelles, Laccadives, Maldives, Chagos Archipelago, Indonesia, Philippines and Gilbert, Phoenix, Fiji, Samoan, Society, Tuamotu, Palmyra and Hawaiian Islands.

Family SYNANCEIDAE

Head usually spinate. Somewhat compressed, head depressed, eyes on dorsal profile. Mouth obliquely directed upwards. Jaws with several rows of small teeth; teeth sometimes present on vomer. Dorsal fin long, its origin generally slightly behind level from eye; spines strong, spinous part generally longer than soft part. Gill openings somewhat restricted. Gill membranes attached to isthmus.

548. *Synanceia verrucosa* Bloch and Schneider

Synanceia verrucosa Bloch and Schneider, Syst. Ichth., p. 195, pl. 45, 1801. Smith, Fishes of Southern Africa, p. 374, pl. 84, fig. 1052, 1949.

Synanceia verrucosa Day, Fishes of India, p. 162, pl. 39, fig. 4, 1878. Regan, Trans. Linn. Soc. London, 12 (3), p. 237, 1908. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 97, fig. 27, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 143/461).

Specimens studied: Agathi (3), 140 to 150 mm. Kalpeni (3), 146 to 187 mm. Kavarathi (14), 158 to 180 mm. Kiltan (1), 145 mm. Minicoy (15), 113 to 168 mm.

D. XIII, 6-7; A. III, 6; P. 18-19; V. I, 5.

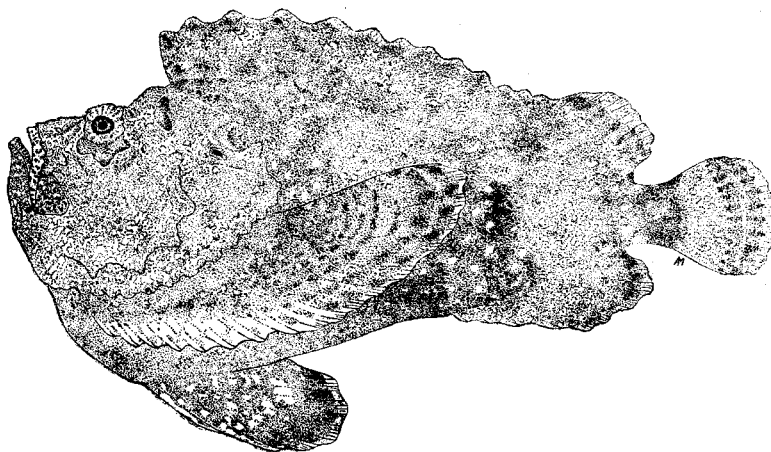


FIG. 548. *Synanceia verrucosa* Bloch and Schneider, 180 mm.

Head 2.3-2.6 in standard length, 2.7-3.0 in total length. Depth of body 2.3-2.7 in standard length, 2.6-3.1 in total length. Eye 9.5-13.0 in head, 2.7-3.6 in snout and 3.0-4.0 in interorbital space. Mouth directed upwards. Teeth in villiform bands in jaws; vomer and palatines edentulous. Preorbital with two spines flaring outwards. A small deep groove below eye. Interorbital space with a deep pit. A deep pit behind each eye, the pits on either side separated by bony elevation. Origin of dorsal above hind border of preopercle. First spine of dorsal as long as snout; fourth or fifth spine longest, equal to snout and eye together; posterior spines slightly shorter. Third anal spine longer than the other two, equal to first spine of dorsal. Soft dorsal rays equal to snout and eye together or a little longer, those of anal slightly shorter. Pectoral rounded, its base oblique; upper edge of base to tip of the fin equal to head without snout or slightly longer. Ventral slightly shorter than pectoral. Sides of head with short papillae, body and tail with numerous fleshy excrescences. Colour: Greyish brown with a broad transverse pale band from base of dorsal to soft anal and sometimes another below spinous dorsal and with scattered irregular lighter markings. Dorsal and anal brownish with irregular light areas, edges of fins whitish. Caudal whitish with broad basal and submarginal brown transverse bands, tips of rays white. Ventral brown with irregular white stripes and spots.

Local names: *Gauviha-mas* (Minicoy). *Peychan*, *Chetta-chammam* (other islands).

Distribution: East coast of Africa, Red sea, Laccadives, Maldives, coasts of India, Indonesia, Philippines and Marshall, Fiji, Samoan, Society and Tuamotu Islands and Australia.

Family PLATYCEPHALIDAE

Body elongate, subcylindrical. Head depressed, ridged and with spines. Mouth large, lower jaw projecting beyond the upper. Teeth small, in villiform bands on jaws, vomer and palatines. Two dorsal fins and a detached spine in front of first dorsal. Scales rough.

About 60 series of scales. A rounded flap on interopercle

..... *Platycephalus malayanus*

About 95 series of scales. Interopercular flap feebly developed

..... *Platycephalus crocodilus*

549. *Platycephalus malayanus* Bleeker

Platycephalus malayanus Bleeker, Nat. Tijds. Ned.-Ind., **5**, p. 498, 1853. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **11**, p. 152, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, **12**, p. 196, fig. 1 C, 1970.

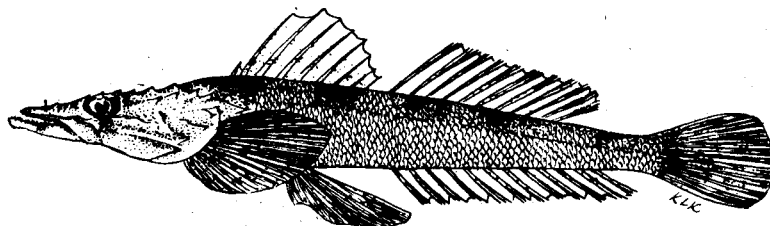


FIG. 549. *Platycephalus malayanus* Bleeker, 134 mm. (after Jones and Kumaran)

Specimens studied: Kavarathi (9), 52 to 137 mm.

D₁. IX; D₂. 11; A. 12; P. ii, 19; V. I, 5. LI. 52-56; Ltr. 7+1+26. GR. 1+1+4-5.

Head 3.0-3.2 in standard length, 3.3-3.7 in total length. Depth of body 7.0-8.8 in standard length, 8.6-10.5 in total length. Eye 4.2-4.8 in head, 1.3-1.6 in snout and 0.2-0.3 in concave interorbital space. Maxillary reaching to below front border of eye. Villiform teeth in jaws, two oval patches of teeth on vomer and a narrow band of teeth on palatines. Two small spines between anterior nostrils. A strong spine on anterior orbital rim. Supraorbital ridge smooth anteriorly and posterior part serrated from above middle of eye with 7 to 12 spines, continued as the superior postorbital ridge with 3 or 4 spines. The inferior postorbital ridge with 5 spines, the last two in line with the lateral line. Suborbital

ridge smooth anteriorly, with one spine below middle of eye and 2 to 4 spines posteriorly. Three preopercular spines, the uppermost one longest and the lowermost one minute. Opercle with two flat spines. Subopercle with somewhat well developed skinny flap. First dorsal spine small, third longest, equal to post-orbital part of head. Pectoral as long as postorbital part of head or longer. Ventral about half eye diameter shorter than head. Lateral line smooth with the two anteriormost scales spiny. Colour: Pale yellowish. Head with 3 or 4 narrow dark lines from eye to cheek. Four faint broad dark cross bands on dorsal side of body; the first below the posterior half of first dorsal, the second below the origin of soft dorsal, the third below the middle of soft dorsal and the fourth on caudal peduncle. The spines of first dorsal and rays of second dorsal with brown spots. Spots on pectoral and pelvic rays in the form of irregular cross bands; the distal margin of anal rays sometimes dusky. Caudal rays with dusky spots.

Local name: *Valakka* (Kavarathi).

Distribution: Laccadives, Indonesia, New Guinea, Philippines, Queensland and Samoa.

550. *Platycephalus crocodilus* Tilesius

Platycephalus crocodilus Tilesius, Krusenstern's Reise, pl. 59, fig. 2, 1812. Smith, Fishes of Southern Africa, p. 378, 1949. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 159, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 144/462).

Platycephalus punctatus Day, Fishes of India, p. 277, pl. 60, fig. 3, 1878.

Thysanophrys crocodilus Munro, Fishes of Ceylon, p. 253, pl. 48, fig. 736, 1955.

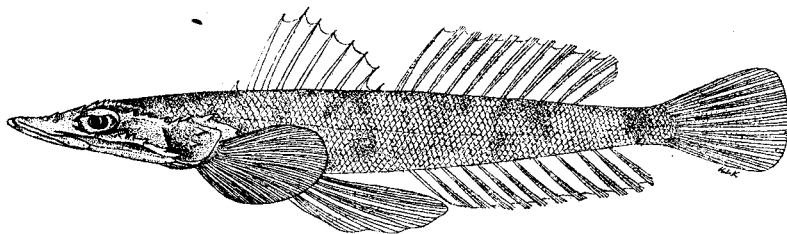


FIG. 550. *Platycephalus crocodilus* Tilesius, 174 mm.

Specimens studied: Agathi (1), 121 mm. Kiltan (3), 118 to 174 mm.

D₁. IX; D₂. i, 10-11; A. i, 10-11; P. ii, 12, vii or ii, 13, vi or ii, 14, vi. Llat. 88-97; Ltr. 7-8+1+19-21.

Head 3.0-3.2 in standard length, 3.7-4.0 in total length. Depth of body 7.6-8.5 in standard length, 8.8-9.9 in total length. Eye 4.4-5.0 in head, 1.3-1.4 in snout and 0.5 in concave interorbital space. Maxillary reaching behind a level from the front border of eye. Teeth in villiform bands in jaws, in two patches on vomer and in a long narrow band on palatines. Two short spines between anterior nostrils. Orbital rim with a spine in front, supraorbital ridge

serrated posteriorly and ending in superior postorbital ridge with one or two spines. Inferior postorbital ridge with 4 to 6 spines. Suborbital ridge with 3 or 4 spines, preopercle angle with 2 spines, the upper one longer than the lower. Two opercular spines. A feebly developed flap on subopercle. Pectoral equal to or a little longer than snout and eye. Ventral shorter than head. Anterior 2 or 3 scales of lateral line with small spines. Colour: Back brownish, becoming lighter below, sides of head and body with irregular dark patches. Spinous dorsal hyaline; soft dorsal and anal hyaline, rays often vaguely spotted; pectoral and ventral with dark transverse bands.

Local name: *Valakka* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Ryukyus, Japan and Palau, Santa Cruz and New Hebrides Islands.

Order DACTYLOPTERIFORMES

Head blunt and encased in bony armour with strong spines and keels. Nasals fused together forming a simple median bone. Post-temporal united with pterotic, tubulars and lateral occipital. 22 vertebrae. 4 pectoral radials. Pectorals very large and in two parts.

Family DACTYLOPTERIDAE

Body elongate, subquadrangular and tapering posteriorly. Head blunt with strong spines and keels, those above the shoulder girdle expanded to large shields. Preopercle with an elongate spine. Mouth inferior, jaws with granular teeth. Two dorsal fins, the first with four or five spines and the soft dorsal with eight rays and a triangular spine in between the two; sometimes a detached occipital spine and another posterior to it in front of spinous dorsal proper. Anal with five or six rays. Pectoral fins reaching to caudal, upper five or six rays shorter. Scales strongly keeled. Lateral line generally absent. Two serrated appendages at base of tail.

Lateral line present. A large black blotch on middle of pectoral

..... *Dactyloptena macracanthus*

No lateral line. Small brown blotches on pectoral *Dactyloptena orientalis*

551. *Dactyloptena macracanthus* (Bleeker)

Dactylopterus macracanthus Bleeker, Nat. Tijds. Ned.-Ind., 7, p. 449, 1854. Alcock, J. Asiatic Soc. Bengal., 65, p. 320, 1896.

Dactyloptena macracanthus de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 176, 1962. Jones and Kumaran, Indian J. Fish., 11, p. 234, figs. 12-14, 1967.

Specimen studied: Kavarathi (1), 45 mm.

D. I+I+V+I+8; A. 6; P. 33; V. I, 4. Ll. 45; Ltr. 26.

Head 3.3 in standard length, 4.1 in total length. Depth of body 3.9 in standard length, 4.9 in total length. Eye 2.4 in head, 0.6 in snout and 1.6 in slightly concave interorbital space. Preopercular spine equal to head without snout. First free ray on occiput with well developed membrane, less than head with preopercular spine. Second detached ray shorter than eye diameter. First spine of first dorsal slightly longer than soft dorsal rays; a short spine just in front of second dorsal. Anal origin nearer to base of caudal than to gill opening. Tip of pectoral not reaching to base of caudal. Ventral shorter than head by half length of snout. Lateral line distinct. Colour: Pale brownish on back, lighter below with brownish bars on back below second isolated ray, below the keel-like spine in front of soft dorsal, last three rays of soft dorsal and just

in front of caudal base. First isolated ray blackish, second isolated ray and first dorsal brownish. Rays of soft dorsal and caudal with dark streaks. Pectoral brownish with a large black blotch on basal third of median rays.

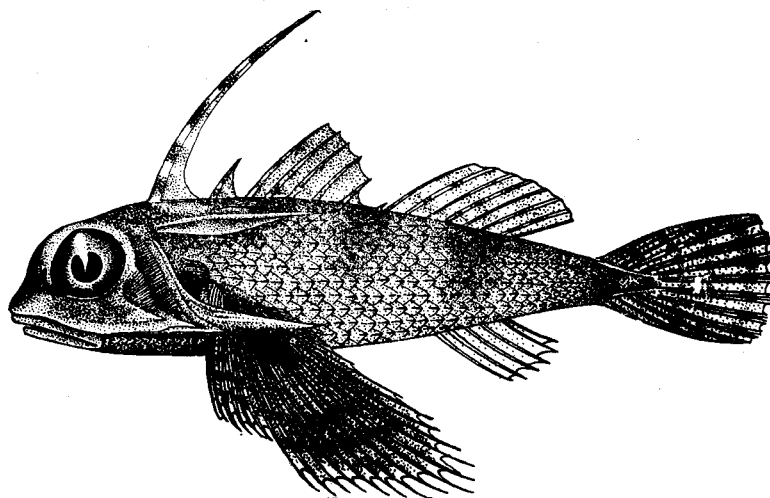


FIG. 551. *Dactyloptena macracanthus* (Bleeker), 45 mm.

Distribution: Off the west coast of India, Laccadives, off Madras and Orissa coasts, Indonesia and Philippines.

552. *Dactyloptena orientalis* (Cuvier)

Dactylopterus orientalis Cuvier, in Cuvier and Valenciennes, Hist. Nat. Poissons, 4, p. 98, pl. 76, 1829.

Dactyloptena orientalis Smith, Fishes of Southern Africa, p. 381, pl. 84, fig. 1076, 1949. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 174, fig. 42, 1962. Jones and Kumaran, Indian J. Fish., 11, p. 235, figs. 6-11, 1967.

Dactylopterus orientalis Day, Fishes of India, p. 169, 1878. Regan, Trans. Linn. Soc. London, 12 (3), p. 240, 1908.

D. I+I+V+I+ 8; A. 6; P. 32-35; V. I, 4-5. Llat. 45-47; Ltr. 21-22.

Body robust, elongate. Head blunt, completely bony with strong spines and keels. A bony ridge across cheek to preopercle. Head 3.5-4.0, depth of body 5.0-6.3, both in standard length. Eye 3.0-3.5 in head, about equal to snout and about 1.5 in concave interorbital space. Maxillary reaching to below anterior half of eye. Preopercular spine as long as head without snout. First ray on occiput isolated with a short posterior membrane, its length almost equal to head including preopercular spine. Second isolated ray above base of pectoral, longer

than eye diameter and with well developed membrane. A short strong spine between first and second dorsal. Pectoral almost reaching to tip of caudal; upper six rays much shorter than longest rays, membrane between fifth and sixth, and sixth and seventh rays deeply incised. Colour: Pale violet or purplish above, slightly lighter below. Dorsal pale brownish, second dorsal and caudal pale with dusky markings, anal hyaline, pectoral pale to light brownish with brown blotches.

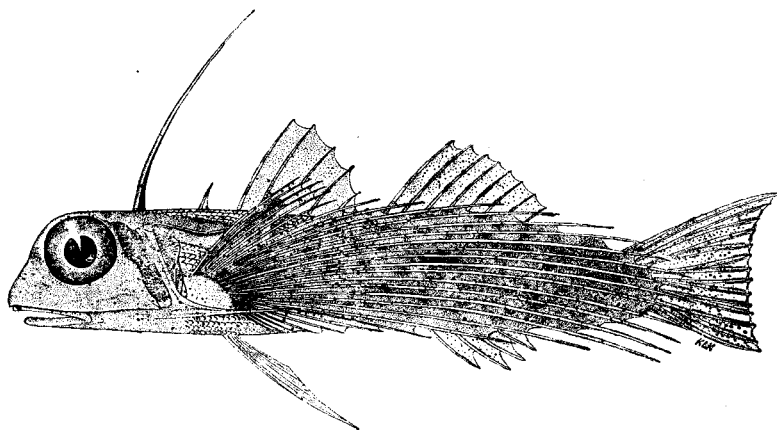


FIG. 552. *Dactyloptena orientalis* (Cuvier), 120 mm.

Distribution: East coast of Africa, Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines, China, Japan, south to Australia and east to Solomon, Society, Tuamotu and Hawaiian Islands.

Note: Larvae of this species were collected from the Laccadive Sea and described by us. The specimen figured was collected from Karwar on the west coast of India.

Order PLEURONECTIFORMES

Flat fishes with both eyes on one side, either on the right or left of the mouth. Skull asymmetrical. Supramaxillary present. Fins usually without spines. No air bladder in adults. Usually not more than 6 rays in ventral; sometimes only one ventral present. The two sides differ in colour, nature of scales and lateral line.

1. Preopercular margin free BOTHIDAE
Preopercular edge covered by skin 2
2. Eyes on right side SOLEIDAE
Eyes on left side CYNOGLOSSIDAE

Family BOTHIDAE

Eyes generally on the left side. Dorsal fin extending on head to above or beyond eye. Preopercular margin free. Ventrals either symmetrical or the left ventral longer than that of the right. Mouth large or moderate, the lower jaw somewhat prominent. Teeth almost equally developed in both jaws. Anterior part of lateral line arched.

553. *Bothus pantherinus* (Rüppell)

Rhombus pantherinus Rüppell, Atlas Reise Nordl. Afrika, Fische Rothen Meeres, p. 121, pl. 3, fig. 1, 1828.

Bothus pantherinus Smith, Fishes of Southern Africa, p. 160, fig. 317, 1949. Munro, Fishes of Ceylon, p. 261, pl. 50, fig. 755, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 149/464).

Bothus (Platophrys) pantherinus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 123, 1929. Balan, J. Bombay nat. Hist. Soc., 55, p. 300, 1958.

Platophrys pantherinus Day, Fishes of India, p. 425, pl. 92, figs. 3 and 5, 1878. Regan, Trans. Linn. Soc. London, 12 (3), p. 232, 1908.

Specimens studied: Agathi (5), 70 to 87 mm. Ameni (9), 82 to 113 mm. Chetlat (3), 112 to 130 mm. Kadamat (14), 80 to 103 mm. Minicoy (29), 52 to 200 mm.

D. 87-98; A. 68-76; P. left. 10-11; P. right. 9-10; V. 6. Ll. 83-86.

Head 3.4-3.7 in standard length, 4.0-4.4 in total length. Depth of body 1.7-1.8 in standard length, 2.0-2.2 in total length. Eye 4.0-4.8 in head, 1.1-1.2 in snout and 1.0-1.4 in interorbital space. Often a small tentacle on eye. Maxillary reaching to below front border of eye or slightly behind. Teeth in two rows in jaws. Left pectoral equal to postorbital length of head plus half eye diameter, right pectoral shorter. Second and third or second to fourth rays of left pectoral filamentous in males. Base of left ventral longer than that of right, its

fourth ray opposite to the first ray of right ventral. 6 or 7 short gill rakers. Colour: Brownish with irregular dark blotches and ocelli; the blotch behind middle of length conspicuous than others. Dorsal, anal, left pectoral and caudal with dark brown spots and streaks.

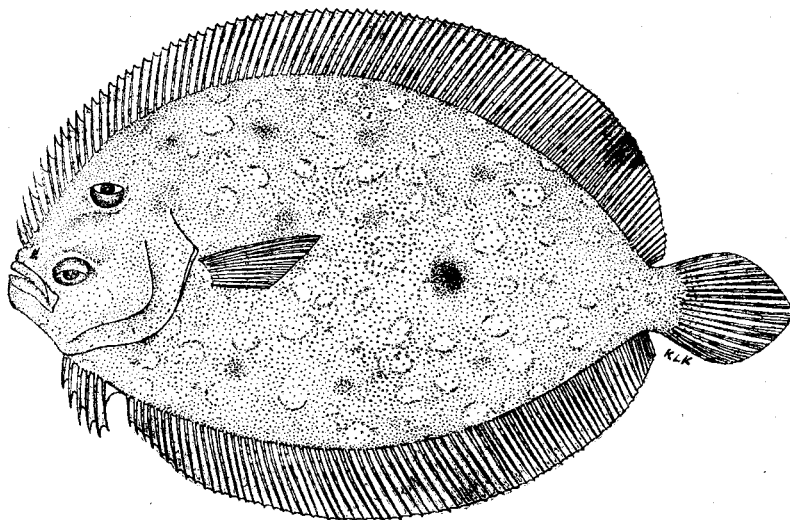


FIG. 553. *Bothus pantherinus* (Rüppell), 123 mm.

Local names: *Mas-madi* (Minicoy). *Lammam*, *Palaka* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India and Ceylon, Indonesia, Philippines and Tahiti, Marquesas and Hawaiian Islands.

Family SOLEIDAE

Eyes on the right side. Dorsal fin extending on head to above eye or beyond. Preopercle edge covered with skin. Ventrals either symmetrical or asymmetrical, free from anal or one connected with anal. Pectorals well developed or rudimentary or absent. Caudal free or confluent with dorsal and anal. Teeth minute on blind side and feebly developed or absent on coloured side. Lateral line straight.

Pectorals present on both sides. One straight lateral line. D. 92-94; A. 81-83.

Ll. 120-123. Several dark incomplete transverse wavy bands on head and body *Aesopia heterorhinos*

No pectorals. Ventrals not united with anal. One lateral line on each side. D. 62-65; A. 43-45. Ll. 68-73. Pale yellowish with small dark spots

..... *Liachirus melanospilus*

554. *Aesopia heterorhinos* (Bleeker)

Solea heterorhinos Bleeker, Act. Soc. Sci. Indo-Neerl., 1, p. 64, 1856.

Aesopia heterorhinos Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 149/465).

Solea heterorhina Day, Fishes of India, p. 426, pl. 92, fig. 5, 1878. Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 148, fig. 38, 1929.

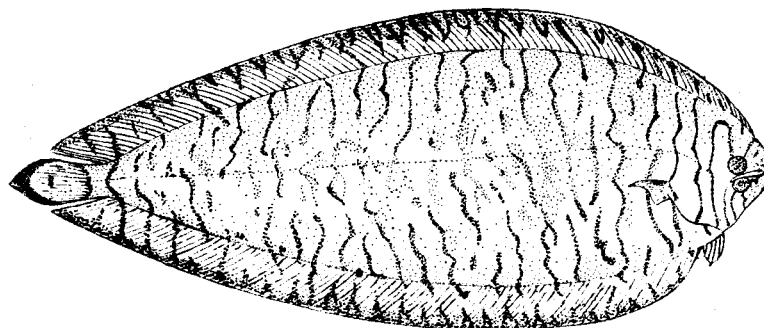


FIG. 554. *Aesopia heterorhinos* (Bleeker), 120 mm.

Specimens studied: Bitra (2), 55 and 120 mm.

D. 92-94; A. 81-83; P. 9; V. 4; LI. 120-123.

Head 5.8-6.2 standard length, 6.7-6.9 in total length. Depth of body 2.8-3.0 in standard length, 3.0-3.2 in total length. Eyes on the right side. Eye 3.5-3.7 in head, the upper eye slightly in advance of the lower and equal to snout. Nasal tentacles longer than eye diameter. Cleft of mouth reaching to below front border of lower eye. Opercular membrane joined to upper rays of pectoral on both sides. Dorsal fin originating above front border of upper eye. Caudal free from dorsal and anal fins. Right pectoral equal to $1\frac{2}{3}$ eye diameter, left pectoral about $\frac{1}{2}$ eye diameter. Lateral line straight, reaching basal third of caudal fin. Colour: Light yellowish brown with several dark incomplete transverse wavy bands from snout to base of caudal; some bands extending on to vertical fins having a submarginal black band; tip of caudal with black marginal band.

Local name: *Lammam* (Bitra).

Distribution: Bitra in the Laccadives, Andamans, Philippines and Marshall, Fiji and Samoan Islands and New South Wales.

555. *Liachirus melanospilus* (Bleeker)

Achirus melanospilos Bleeker, Nat. Tijds. Ned.-Ind., 7, p. 257, 1854.

Liachirus melanospilus Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 158, figs. 42 and 43, 1929. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 174, fig. 14, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 150/466).

Specimens studied: Ameni (1), 57 mm. Minicoy (3), 62 to 83 mm.

D. 62-65; A. 43-45; V. 5. Ll. 68-73.

Head 3.7-4.0 in standard length, 4.4-4.6 in total length. Depth of body 2.2-2.4 in standard length, 2.7-2.9 in total length. Eyes on the right side. Eye 4.8-5.2 in head, the lower one about $\frac{1}{2}$ eye diameter behind the upper, it being about 1.2 in snout. Interorbital space slightly concave. Cleft of mouth reaching to below front border of eye. Nasal tentacle short, not reaching front border of lower eye. Dorsal origin near tip of snout. Dorsal and anal ending close to caudal. Base of right ventral slightly more than that of left ventral and originating anterior to the latter. Ventrals free from anal. Pectorals absent. One lateral line on each side and another along dorsal profile of head on the blind side from snout to nape. Short barbels along the lower profile on the left side of head. Colour: Pale yellowish with small dark spots on coloured side.

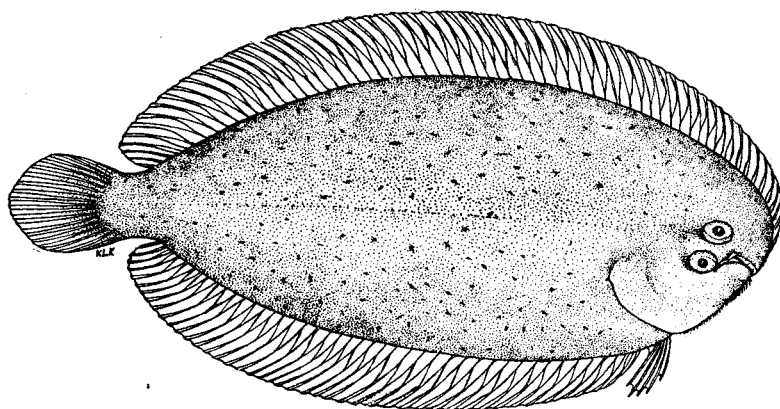


FIG. 555. *Liachirus melanospilus* (Bleeker), 83 mm. (after Jones and Kumaran)

Distribution: Laccadives, Singapore, Indonesia, Philippines, China, Taiwan and Japan.

Family CYNOGLOSSIDAE

Eyes on the left side. Only the left ventral present, may or may not be connected with anal. Dorsal and anal confluent with caudal. Pectorals absent. Mouth asymmetrical, the snout hooked and overhanging the mouth. Lips of coloured side sometimes with a row of fringed tentacles. Two or three lateral lines on the coloured side; one or two lateral lines on the blind side or sometimes no lateral line at all.

556. *Paraplagusia bilineata* (Bloch)

Pleuronectes bilineatus Bloch, Naturges. Ausl nd. Fische, 3, p. 29, 1784.

Paraplagusia bilineata Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 5, p. 183, figs. 50 and 51, 1929. Smith, Fishes of Southern Africa, p. 165, fig. 335,

1949. Munro, Fishes of Ceylon, p. 264. pl. 51, fig. 765, 1955. Jones, Bull. cent. mar.

Fish. Res. Inst., 8, p. 29, 1969 (Cat. No. CMFRI-LA-F. 151/467).

Plagusia marmorata Day, Fishes of India, p. 431, pl. 65, fig. 1, 1878.

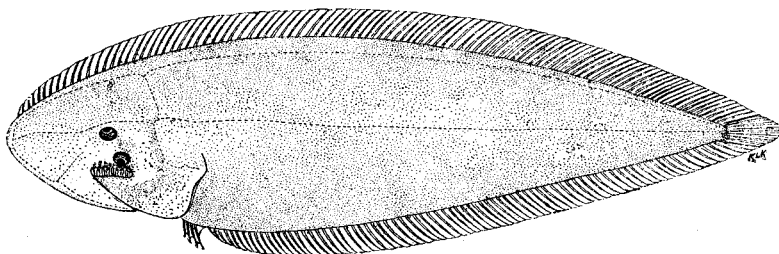


FIG. 556. *Paraplagusia bilineata* (Bloch), 125 mm.

Specimen studied: Ameni (1), 125 mm.

D. 104; A. 78; V. 4; Ll. 103.

Head equal to depth of body, 3.7 in standard length, 4.0 in total length. Eyes on the left side, the upper in advance of the lower. Eye about 12.5 in head, nearly one eye diameter apart and situated in the middle of head. Cleft of mouth below hind border of lower eye and nearer to hind edge of preopercle than to tip of snout. Lips of coloured side fringed. A short tubular nostril in front of lower eye. Only the left ventral present, attached to the anal. Hook of upper jaw reaching beyond hind border of lower eye. Two lateral lines on the coloured side separated by 17 scales and one on the blind side, without pores. Colour: Brownish, finely marbled dark.

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Japan and Bismarck Archipelago.

Order ECHENEIFORMES

Body elongate. First dorsal fin transformed into an adhesive disc with transverse laminae. No spines in dorsal and anal fins. No air bladder. Vertebrae 23 to 30.

Family ECHENEIDAE

Elongate or moderately elongate. Mouth large, the lower jaw projecting beyond the upper. Teeth small in bands in jaws, vomer and palatines; sometimes the outer series in jaws caninoid. Spinous dorsal on the top of head, transformed into an oval adhesive sucking disc with posteriorly denticulated transverse laminae. Second dorsal and anal long, opposite to each other.

1. Caudal fin lanceolate in young and truncate in adults; pectoral fin acute; anal rays more than 30; lower jaw produced in a flap; a dark lateral stripe present 2
Caudal fin somewhat forked in young, emarginate or truncate in adults; pectoral rounded; less than 25 anal rays; lower jaw not produced in a flap; no dark lateral stripe 3
2. 22-25 laminae in disc. GR. 1++16 *Echeneis naucrates*
11 laminae in disc. GR. 1+1+10 *Phtheichthys lineatus*
3. Ventrals narrowly adnate to abdomen. D. 18; 13 disc laminae; disc not quite reaching end of pectoral *Remora albescens*
Ventrals broadly adnate to abdomen. D. 22-25; 17-19 disc laminae 4
4. Gill rakers on lower limb 24-26; 17 disc laminae; disc not extending to tip of pectoral *Remora remora*
Gill rakers on lower limb 10-11; 18-19 disc laminae; disc extending well beyond tip of pectoral; pectoral rays stiff *Remora osteochir*

557. *Echeneis naucrates* Linnaeus

Echeneis naucrates Linnaeus, Syst. Nat., ed. 10, 1, p. 261, 1758 (amended to *naucrates*). Day, Fishes of India, p. 257, pl. 57, fig. 1, 1878.

Echeneis naucrates Smith, Fishes of Southern Africa, p. 342, fig. 949, 1949. Munro, Fishes of Ceylon, p. 268, pl. 52, fig. 779, 1955. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 439, fig. 96, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 153/468).

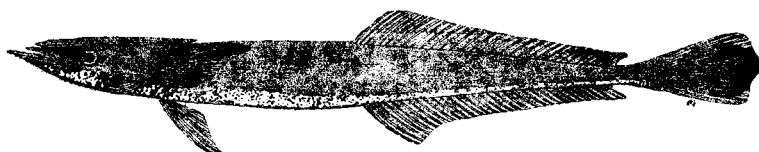


FIG. 557. *Echeneis naucrates* Linnaeus, 307 mm.

Specimens studied: Minicoy (3), 307 to 460 mm.

D. 34-35; A. 33-35; P. 20; V. I, 5. GR. 1+1+16.

Body comparatively elongate, slender. Head 5.0-5.1 in standard length, 5.8-6.1 in total length. Depth of body 9.4-10.0 in standard length, 11.0-12.0 in total length. Eye 6.2-6.4 in head and 2.6-2.8 in snout. Sucking disc with 22 to 25 transverse laminae, reaching somewhat a level from middle of pectoral, 1.30-1.45 of head, its breadth 2.3-2.5 in its length. Lower jaw produced in a flap. Jaws with broad bands of sharp conical teeth, those on outer margin of lower jaw largest. Narrow band of teeth on vomer and palatines. Maxillary reaching to below nostrils. Scales minute. Origin of soft dorsal nearer to base of caudal than to tip of snout. Anterior rays of dorsal about equal to snout. Longest anal rays longer than snout. Pectoral pointed with flexible rays, its length about half length of snout shorter than head. Ventral narrowly adnate to abdomen, shorter than pectoral. Caudal somewhat truncate or central rays slightly produced. Colour: Bluish brown above, lower sides lighter. A dark brown horizontal band from snout through eye to end of caudal fin leaving the external margin of the fin whitish. Dorsal and anal light brownish, broadly edged lighter in front. Pectoral brown. Ventral light brown.

Local name: *Feesung* (Minicoy).

Distribution: Tropical and subtropical Atlantic, Indian and Pacific Oceans.

558. *Phtheirichthys lineatus* (Menzies)

Echeneis lineata Menzies, Trans. Linn. Soc., London, 1, p. 187, pl. 17, fig. 1, 1791.

Phtheirichthys lineatus Smith, Fishes of Southern Africa, p. 341, fig. 945, 1949. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 436, fig. 95, 1962. Jones and Kumaran, J. Mar. Biol. Ass. India, 8, p. 175, fig. 15, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969. (Cat. No. CMFRI-LA-F. 153/469).

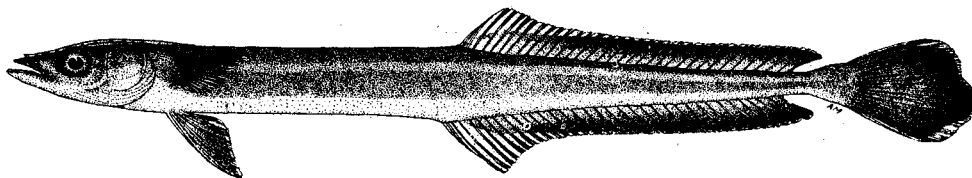


FIG. 558. *Phtheirichthys lineatus* (Menzies), 215 mm. (after Jones and Kumaran)

Specimen studied: Agathi (1), 215 mm. Found attached to a sailfish.

D. 35; A. 35; P. 18; V. I, 5. GR. 1+1+10.

Body very slender, subcylindrical. Head 5.8 in standard length, 6.8 in total length. Depth of body 11.2 in standard length, 13.2 in total length. Eye

5.3 in head and 1.8 in snout. Maxillary reaching to below nostrils. Lower jaw produced in a flap. Jaws with 3 or 4 rows of strong conical teeth; palatines with a band of small teeth. Sucking disc with 11 transverse laminae, slightly longer than head, its breadth 2.1 in its length, its posterior end above middle of pectoral. Origin of soft dorsal midway between eye and base of caudal, its longest rays twice in head. Longest anal rays about 1.8 in head. Pectoral pointed with flexible rays, its length being equal to head without snout. Ventral narrowly adnate to abdomen, slightly longer than pectoral. Body covered with minute scales. Colour: Dark brown above, lighter below with a blackish band from snout through eye to middle of base of caudal. Dorsal and anal dark brown with white outer border becoming increasingly narrower posteriorly. Caudal black with white upper and lower edges. Pectoral blackish, the outer border lighter. Ventral brown.

Local name: *Keesakam* (Agathi).

Distribution: Occasionally recorded from the tropical Indian, Pacific and Atlantic Oceans.

559. *Remora albenscens* (Temminck and Schlegel)

Echeneis albenscens Temminck and Schlegel, Fauna Japonica, Pisces, p. 292, pl. 120, fig. 3, 1850. Day, Fishes of India, p. 258, pl. 57, fig. 2, 1878. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **11**, p. 441, 1962. *Remora albenscens* Smith, Fishes of Southern Africa, p. 341, 1949. Munro, Fishes of Ceylon, p. 268, pl. 52, fig. 780, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 153/471).

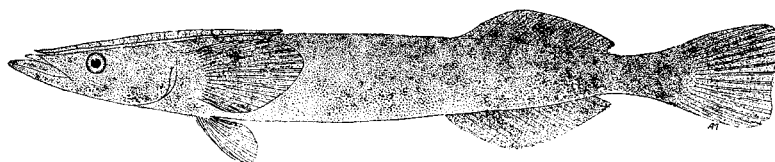


FIG. 559. *Remora albenscens* (Temminck and Schlegel), 110 mm.

Specimen studied: Minicoy (1), 110 mm. Collected from the gill chamber of *Manta birostris*.

D. 18; A. 19; P. 18; V. I, 5.

Body stout, moderately elongate. Head 4.3 in standard length, 4.9 in total length. Depth of body 7.3 in standard length, 8.7 in total length. Eye 6.6 in head and 2.8 in snout. Sucking disc with 13 transverse laminae, not quite reaching to end of pectorals, 1.55 in head, its breadth 1.55 in its length. A row of hooked teeth in front of upper jaw with several rows of shorter teeth behind. Lower jaw with bands of small teeth, outer row caninoid. Maxillary reaching

to below hind nostril. Dorsal origin somewhat behind a level from that of anal, and midway between tip of sucking disc and base of caudal. Pectoral rounded, about 1.3 in head. Caudal truncate. Ventral narrowly adnate to abdomen, slightly more than postorbital length of head. Colour: Uniform brownish.

Local name: *Atta-mas* (Minicoy).

Distribution: Coasts of South Africa, Laccadives, seas of India, Indonesia, Philippines, China, Japan and Marquesas and Hawaiian Islands and the Atlantic.

560. ***Remora remora*** (Linnaeus)

Echeneis remora Linnaeus, Syst. Nat., ed. 10, p. 260, 1758. Day, Fishes of India, p. 258, 1878.

Remora remora Smith, Fishes of Southern Africa, p. 341, fig. 947, 1949. Munro, Fishes of Ceylon p. 268, pl. 52, fig. 781, 1955. Smith and Smith, Fishes of Seychelles, p. 50, pl. 35, I, 1963.

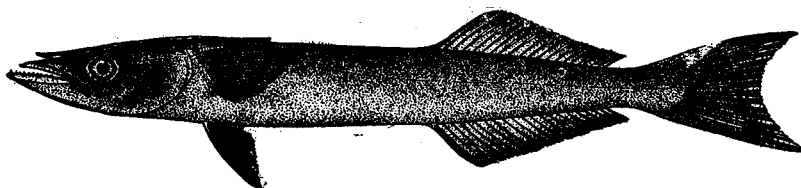


FIG. 560. *Remora remora* (Linnaeus), 143 mm.

Specimens studied: Kavarathi (2), 130 and 143 mm.

D. 23-24; A. 24; P. 24; V. I, 5. GR. 4-5 + 1 + 24-26.

Body moderately robust. Head 3.5-3.7 in standard length, 4.3-4.6 in total length. Depth of body 6.6-7.5 in standard length, 8.1-9.2 in total length. Eye 7.0-7.3 in head and 2.8-3.0 in snout. Maxillary reaching behind a vertical from nostrils. Lower jaw not produced in a flap. Teeth in jaws and on vomer in villiform bands; outer row of teeth in lower jaw larger. Sucking disc with 17 laminae, 3.2-3.3 in total length, about 1.4 times of head, its breadth twice in its length. Disc not extending posteriorly as far as end of depressed pectoral fin. Second dorsal commencing midway between base of pectoral and base of caudal. Pectoral rounded, equal to or slightly longer than snout and eye together. Ventral fins broadly adnate to the abdomen, shorter than pectoral. Caudal fin slightly forked. Colour: Head, body and median fins brown; pectoral fin lighter near tip.

Local names: *Keesakam*, *Kottar-keesakam* (Kavarathi).

Distribution: Widely distributed in tropical and temperate seas.

561. *Remora osteochir* (Cuvier)

Echeneis osteochir Cuvier, Regne Animal., ed. 2, p. 348, 1829. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 442, 1962.
Remora osteochir Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 176, fig. 16, 1966.
 Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 153/470).

Specimens studied: Agathi (1), 96 mm. Bitra (1), 64 mm. Kavarathi (1), 183 mm. Minicoy (2), 94 and 108 mm. Found attached to sailfish.

D. 22-25; A. 22-24; P. 21-23; V. I, 5. GR. 1+1+10-11.

Body moderately elongate, covered with minute scales. Head 4.2-4.7 in standard length, 5.0-5.6 in total length. Depth of body 7.4-8.0 in standard length, 8.9-10.8 in total length. Eye 6.4-8.7 in head, 2.6-3.8 in snout. Maxillary reaching to below nostrils. Lower jaw not produced in a flap. Upper jaw with an outer row of flexible close set small teeth and a narrow band of teeth within. Lower jaw with a narrow band of teeth, some posterior teeth of the outer row slightly larger. Vomer and palatines with a band of minute teeth. Sucking disc elongate, 1.8-2.0 times of head, with 18 or 19 transverse laminae, its breadth 2.2-2.3 in its length, its posterior end extending well beyond tip of pectoral. Longest dorsal rays slightly shorter than those of anal. Longest anal rays almost equal to head without snout. Pectoral rounded, rays stiff, multibranched and half length of snout shorter than head. Ventral broadly adnate to the abdomen, equal to head without snout. Caudal fin emarginate. Colour: Uniform brownish, scarcely lighter below. Fins brownish to dark brown especially towards the edges.

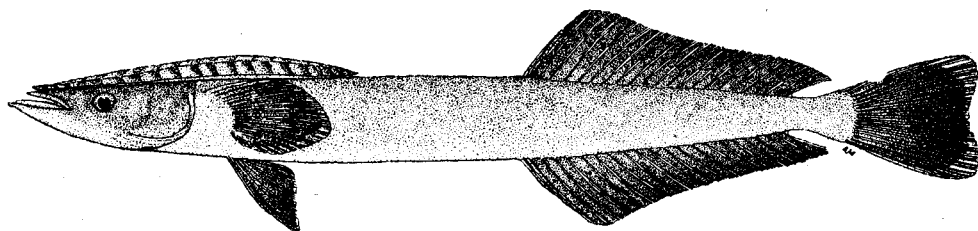


FIG. 561. *Remora osteochir* (Cuvier), 96 mm. (after Jones and Kumaran)

Local names: *Feesung*, *Atta-mas* (Minicoy). *Keesakam* (other islands).

Distribution: Atlantic and New Guinea in the Pacific and Laccadives in the Indian Ocean.

Order TETRAODONTIFORMES

Post-temporal when present, simple and united by suture to pterotic. No lower ribs. No parietals. Nasals and infraorbitals present. Maxillaries united with premaxillaries. Gill openings restricted. Ventral fins when present, thoracic or subthoracic. Pelvic bones when present more or less coalesced. No true scales, but with denticles, scutes or covering of bony plates.

1. Teeth not coalesced 2
Teeth coalesced into a beak 5
2. Body encased in a carapace. Spinous dorsal and ventrals absent
..... OSTRACIONTIDAE
Body with hard or spinous scales. Spinous dorsal present 3
3. Ventrals paired, each with a long stout spine TRIACANTHIDAE
Ventrals absent or fused into a single short spine 4
4. Skin hard, with large bony scales in regular series BALISTIDAE
Scales small or minute, not in regular series MONACANTHIDAE
5. Teeth in each jaw fused without median suture DIODONTIDAE
Fused teeth in each jaw with a median suture 6
6. Body compressed; lateral line absent CANTHIGASTERIDAE
Body rotund; lateral line present 7
7. Two distinct nostrils on each side LAGOCEPHALIDAE
A single nostril on each side, or an open nasal sac, appearing as two solid
tentacles TETRAODONTIDAE

Family TRIACANTHIDAE

Compressed, snout pointed, tail tapering to the base of caudal. Supra-occipital elevated. First dorsal with five spines; second dorsal with several rays; anal slightly shorter and opposite to soft dorsal. Ventral of only one strong spine. Teeth in two rows in jaws, those of the inner row rounded and those of the outer series pointed. Body rough with minute scales.

1. Upper profile of snout straight. Pelvics between ventral spines scarcely narrow behind. A median ridge on interorbital space 2
Upper profile of snout slightly concave. Pelvics narrow and tapering behind. Membrane between first two dorsal spines dark brown
..... *Triacanthus biaculeatus*
2. Depth of body 2.5-2.6 in standard length. Membrane between dorsal spines dark brown *Triacanthus brevirostris*
Depth of body 1.8-1.9 in standard length. Membrane between dorsal spines dark *Triacanthus nieuhofi*

562. *Triacanthus biaculeatus* (Bloch)

Balistes biaculeatus Bloch, Naturges. Ausland. Fische, 2, p. 17, pl. 148, fig. 2, 1786. Bennett, Fish. Ceylon, p. 15, pl. 15, 1830.

Triacanthus biaculeatus Munro, Fishes of Ceylon, p. 273, pl. 54, fig. 796, 1955. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 270, 1962.

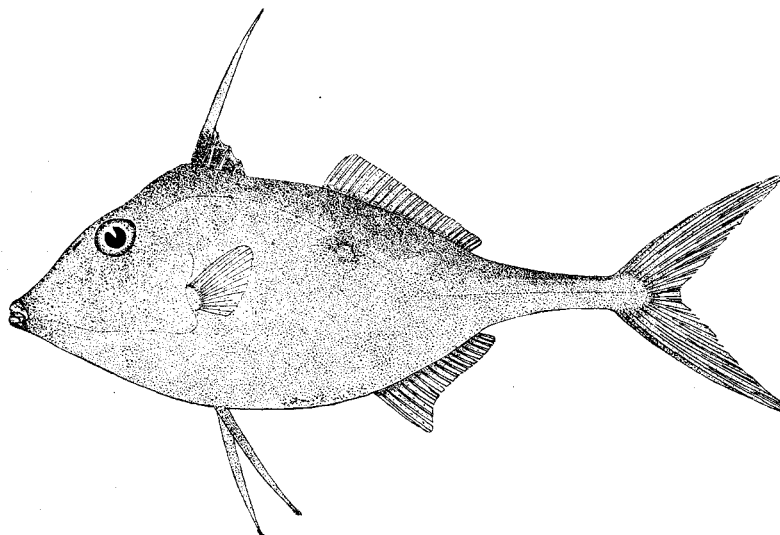


FIG. 562. *Triacanthus biaculeatus* (Bloch), 102 mm.

Specimen studied: Agathi (1), 102 mm.

D₁. V; D₂. 23; A. 18; P. 14; V. I.

Head about 3.5, depth about 2.5, both in standard length. Eye 3.7 in head, about 3.0 in snout and slightly less than interorbital space. Profile of snout slightly concave. First dorsal spine longer than head; second dorsal spine less than one fifth of first spine, other spines increasingly shorter. Interspace between dorsals slightly more than eye diameter. Pelvics between ventral spines narrow and tapering behind. Length of caudal peduncle about 4.5 in standard length. Colour: Light brownish on back; whitish below. Membranes between first and second dorsal spines dark brown.

Distribution: Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Australia.

563. *Triacanthus brevirostris* Schlegel

Triacanthus brevirostris Schlegel, Fauna Japonica, Pisces, p. 294, pl. 129, fig. 2, 1850. Day, Fishes of India, p. 685, pl. 175, fig. 1, 1878. Munro, Fishes of Ceylon, p. 273, pl. 54, fig. 795, 1955. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 273, 1962.

Specimens studied: Kavarathi (3), 92 to 108 mm.

D₁. V; D₂. 22-24; A. 18-19; P. 13-14; V. I.

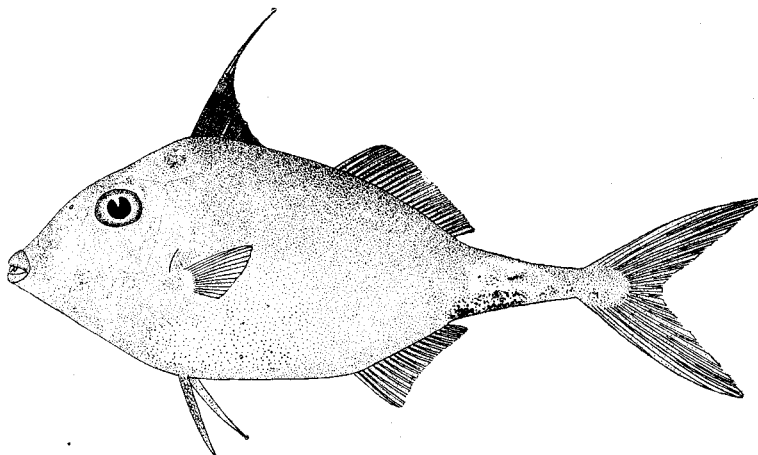


FIG. 563. *Triacanthus brevirostris* Schlegel, 108 mm.

Head 3.3-3.6, depth of body 2.5-2.6, both in standard length. Eye 3.0-3.3 in head, 2.0-2.3 in snout and equal to or slightly less than interorbital space. Interorbital space with a median ridge. Dorsal profile of snout straight. First dorsal spine very strong, about equal to head; second spine about one third of first spine, other spines increasingly shorter. Base of anal about 1.5 in that of second dorsal. Pelvics between ventral spines broad. Colour: Back light brownish, becoming yellowish white below. Base of first dorsal spine and membrane between spines dark brown.

Distribution: Laccadives, coasts of India, Ceylon, Indonesia, Thailand, Philippines, China, Korea and Admiralty Islands.

564. *Triacanthus nieuhofi* Bleeker

Triacanthus Nieuhofi Bleeker, Verh. Bat. Gen., 24, p. 26, 1852.

Triacanthus nieuhofi de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 275, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, 10, p. 331, fig. 12, 1968. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 155/258).

Specimens studied: Minicoy (2), 40 and 48 mm.

D₁. V; D₂. 24; A. 20; P. 15. V. I.

Head 3.2-3.3 in standard length, 4.1-4.2 in total length. Depth of body 1.8-1.9 in standard length, 2.3-2.4 in total length. Eye 2.7-3.0 in head, 1.6 in snout and equal to interorbital space. Profile of snout nearly straight. Interorbital space with a median ridge. First spine of dorsal slightly longer than head.

Ventral spine shorter than head. Pectoral 1.3 times eye diameter. Caudal peduncle about 4.5 in standard length. Colour: Back grayish, silvery on sides and below and a broad dark area from base of first dorsal towards belly. Membrane between first and third dorsal spines dark.

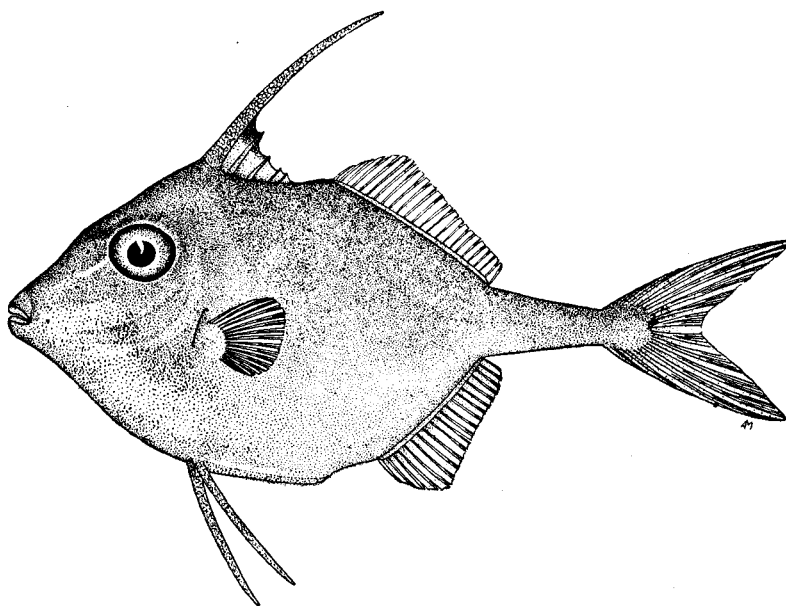


FIG. 564. *Triacanthus nieuhofi* Bleeker, 48 mm. (after Jones and Kumaran)

Local name: *Thinkari-mas* (Minicoy).

Distribution: Minicoy in the Laccadives, Malaysia, Indonesia and China.

Family BALISTIDAE*

Body oblong, compressed, covered with osseous scales. Teeth large, not coalesced, the outer series pointed, inner series in upper jaw flat and plate-like. Two dorsal fins; the spinous dorsal consisting of three spines, the first spine longer and much stronger than the other two. Second dorsal and anal long, consisting of soft rays only. A single ventral spine, usually movable.

1. A short deep groove before eye, below nostril 2
No deep groove before eye 7
2. Teeth red, two lateral teeth in upper jaw fang-like. Outer rays of caudal filamentous *Odonus niger*
Teeth not red and not greatly produced. Outer rays of caudal not filamentous 3

* Ltr. scales counted in all balistids from below origin of second dorsal to base of anal.

3. Scales just behind gill opening not osseous and enlarged. Soft dorsal and anal elevated, front rays as long as snout and eye together. A deep groove in front of eye. Third anal spine well developed. Ventral spine not movable. Brown with grey spots on head, body and tail
..... *Canthidermis rotundatus*
Enlarged osseous plates behind gill openings 4
4. No tubercles or spines on scales of body. Anterior rays of dorsal and anal slightly elevated. Head, body and vertical fins black except for a white line at base of soft dorsal and anal *Melichthys niger*
Tubercles or spines present on scales, at least of tail 5
5. Seven rows of tubercles on caudal peduncle. Head and body brown with two pale cross bands on chin *Sufflamen chrysoptera*
Three or five rows of tubercles on caudal peduncle 6
6. A broad dark brown band over interorbital space continued below eye over gill opening to pectoral base *Balistoides viridescens*
Lower part of head and body with large white blotches
..... *Balistoides conspicillum*
7. Cheeks almost naked anteriorly; scales posteriorly on head much smaller than those of the body. Soft dorsal and anal rather elevated. Posterior part of tail with five rows of small conical spines
..... *Pseudobalistes flavimarginatus*
Cheeks completely scaled. Soft dorsal and anal not elevated 8
8. Third dorsal spine about half length of the second. Two rows of 3 to 5 strong spines on caudal peduncle and posterior part of tail. Dark brown with 12 to 15 parallel, more or less undulating yellow bands on sides
..... *Balistapus undulatus*
Third dorsal spine minute. Caudal peduncle constricted 9
9. Four or five longitudinal rows of antrorse spines on caudal peduncle and posterior part of tail. Yellowish, back dusky grey; dark bluish brown band from eye to gill opening and to vent and base of anal, this band bordered behind with narrow bluish stripe and a narrow band from the middle of this stripe to the end of base of second dorsal; a black angular band on the free portion of tail *Rhinecanthus rectangulus*
Three rows of black antrorse spines on posterior part of tail and caudal peduncle, the lower one short, developed only on caudal peduncle. A dark bluish brown band from gill opening backwards and upwards, bifurcating on body, one branch to the anterior and another broader branch to the posterior base of second dorsal and five narrow stripes obliquely descending to base of anal. Interorbital space bluish brown with 3 or 4 dark brown bands connecting eyes
..... *Rhinecanthus aculeatus*

565. *Odonus niger* (Rüppell)

Xenodon niger Rüppell, Neue Wirbelt., Fische Rothen Meeres, p. 14, fig. 3, 1835.

Balistes niger Lacépède, Hist. Nat. Poissons, 1, pp. 335 and 378, pl. 15, fig. 2, 1798.

Balistes erythrodon Day, Fishes of India, p. 692, pl. 175, fig. 4, 1878. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 295, 1962.

Odonus niger Smith, Fishes of Southern Africa, p. 407, pl. 89, fig. 1155, 1949. Munro, Fishes of Ceylon, p. 270, pl. 53, fig. 784, 1955. Jones, Bu'l. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 154/473). Klausewitz, Senck. biol., 55 (1/3), p. 54, figs. 10 and 20, 1974.

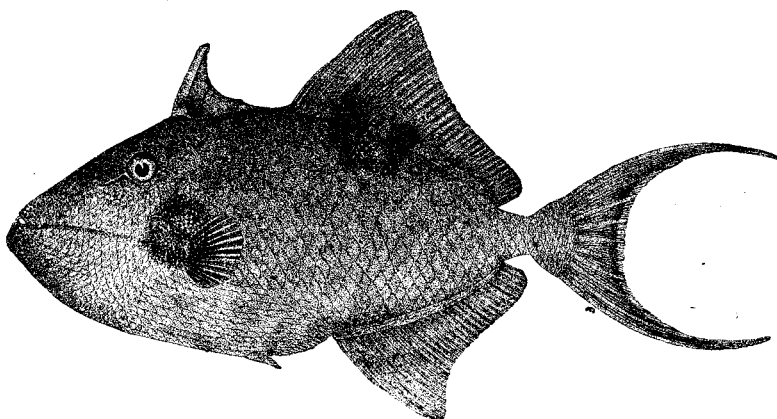


FIG. 565. *Odonus niger* (Rüppell), 170 mm.

Specimens studied: Androth (1), 172 mm. Bitra (1), 215 mm. Minicoy (4), 160 to 180 mm.

D₁. III; D₂. ii, 32-34; A. ii, 27-29; P. i, 13. Llat. 27-28 + 8-9; Ltr. 18-19.

Head 3.3-3.5 in standard length, 4.7-4.9 in total length. Depth of body 2.1-2.2 in standard length, 3.0-3.2 in total length. Upper profile of head slightly convex, chin prominent. Eye 4.9-5.2 in head, 3.3-3.5 in snout and 1.5-1.8 in convex interorbital space. A groove before eye. Teeth red, one on each side of the symphyseal pair in upper jaw fang-like. First dorsal spine compressed, equal to $\frac{1}{2}$ length of head, its sides and front covered with tubercles. Second dorsal spine about $\frac{1}{2}$ length of first spine, third spine equal to $\frac{1}{3}$ of second spine. Anterior rays of 2nd dorsal and anal elevated, rays becoming shorter posteriorly. Pectoral about $\frac{2}{5}$ of head. Ventral spine movable, covered with tubercles. Caudal deeply concave, outer rays produced into filaments. Scales along middle of body and caudal peduncle each with an elevated tubercle. Colour: Dark brown to bluish black with a black stripe from mouth towards base of pectoral. Fins of the same colour as body, caudal with white posterior edge.

Local names: *Nagudigu-kalihi* (Minicoy). *Choppu-pallan*, *Valan-karatti* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines, China and Society, Gilbert and Marquesas Islands.

566. *Canthidermis rotundatus* (Procé)

Balistes rotundatus Procé, Bull. Soc. Philom., p. 130, 1822. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 309, 1962.

Balistes maculatus Day, Fishes of India, p. 687, pl. 175, fig. 3, 1878.

Canthidermis maculatus Smith, Fishes of Southern Africa, p. 409, pl. 91, fig. 1166, 1949.

Canthidermis rotundatus Munro, Fishes of Ceylon, p. 271, pl. 53, fig. 786, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 154/472).

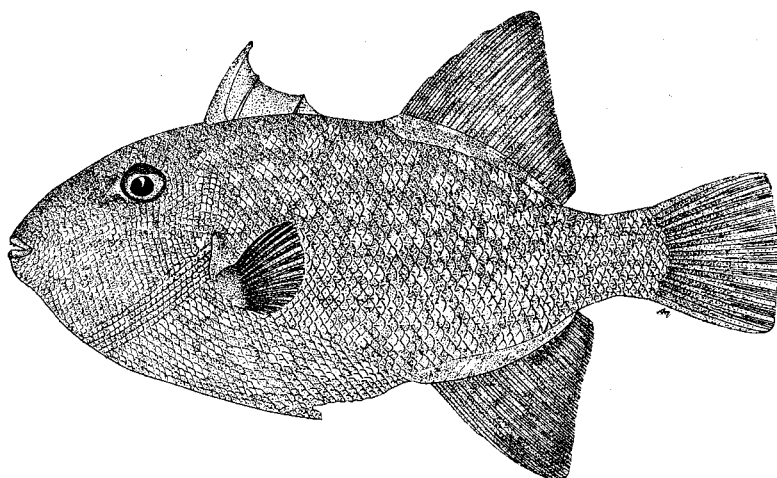


FIG. 566. *Canthidermis rotundatus* (Procé), 295 mm.

Specimens studied: Minicoy (8), 85 to 295 mm.

D₁. III; D₂. ii, 23-24; A. i, 21-22; P. i, 13-14; Llat. 42-44 + 6-7; Ltr. 29-32.

Head 3.0-3.3 in standard length, 3.5-4.0 in total length. Depth of body 2.1-2.6 in standard length, 2.5-3.1 in total length. Eye 4.3-5.1 in head, 2.5-3.0 in snout and 1.6-1.9 in highly convex interorbital space. A deep groove in front of eye. Anterior side of first dorsal spine covered with spinules, its length more or less than half length of head; second spine more or less than half of first spine; third spine more than half of second spine. Anterior rays of dorsal and anal elevated, as long as snout and eye together, rays becoming shorter posteriorly. Pectoral equal to or a little more than $\frac{2}{5}$ of head. Ventral spine immovable, short and with spinules. Caudal rounded in young; lobes pro-

duced in large specimens. Scales on head and body rough, each with a short spine in juveniles or with a median ridge in large specimens. Colour: Brown to dark bluish brown with round to oblong grey spots on head, body and tail. Fins brown to dark brown. Grey spots present on dorsal and anal in juvenile specimens.

Local name: *Sikki-kalihi* (Minicoy).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Taiwan, China, Japan, Australia and Hawaiian and Galapagos Islands.

567. *Melichthys niger* (Bloch)

Balistes ringens Osbeck, Reise Nach Ostindien und China, p. 386, 1765 (not of Linnaeus).

Balistes niger Bloch, Naturges. Ausl nd. Fische, 2, p. 27, pl. 152, fig. 2, 1786.

Balistes radula Solander, in Richardson, Voy. *Samarang*, Fishes, p. 22, pl. 6, figs. 1-4, 1848.
de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 283, 1962.

Balistes buniva Day, Fishes of India, Suppl., p. 808, 1888.

Melichthys radula Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 154/474).

Melichthys ringens Smith, Fishes of Southern Africa, p. 408, text fig. 1159, 1949 (not of Linnaeus). Munro, Fishes of Ceylon, p. 271, pl. 53, fig. 787, 1955 (not of Linnaeus). Balan, J. Bombay nat. Hist. Soc., 55, p. 303, 1958 (not of Linnaeus). Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959 (not of Linnaeus).

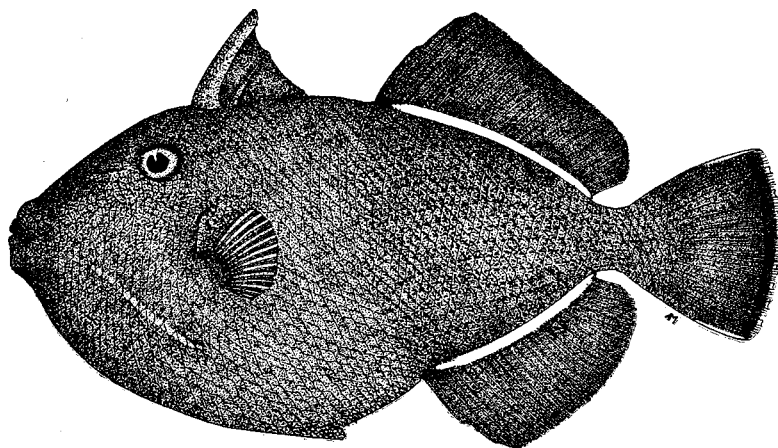


FIG. 567. *Melichthys niger* (Bloch), 129 mm.

Specimens studied: Agathi (1), 137 mm. Ameni (1), 169 mm. Androth (2), 143 and 182 mm. Kavarathi (4), 121 to 198 mm. Minicoy (2), 129 and 158 mm.

D₁. III; D₂. ii, 30-32; A. ii, 26-27; P. i, 13 (14). Llat. 46-58+12-14; Ltr. 24-26.

Head 3.1-3.3 in standard length, 3.75-4.10 in total length. Depth of body 1.9-2.1 in standard length, 2.3-2.5 in total length. Upper profile of head convex. Eye 4.6-5.7 in head, 3.3-4.0 in snout and 1.7-2.1 in highly convex interorbital space. A distinct groove before eye, below the nostril. A narrow groove behind corner of mouth obliquely downwards to below gill opening. A group of enlarged osseous plates behind gill opening. First dorsal spine with small spinules in front, its length a little more than half length of head; second dorsal spine about 3/5th of first spine; third spine minute. Anterior rays of dorsal and anal longest, rays decreasing in length gradually to the last. Pectoral much less than half length of head. Scales of tail and caudal peduncle each with a low longitudinal ridge. Colour: Head, body and vertical fins black, base of second dorsal and anal white; caudal with a narrow white hind border and a black submarginal vertical band. Pectoral black, membrane hyaline posteriorly. Groove behind corner of mouth pale. Upper and lower caudal rays edged white in some small specimens.

Local names: *Kalihi* (Minicoy). *Karutha-karatti* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, China and Hawaiian Islands and eastwards to the islands off the Pacific coast of Mexico.

568. *Sufflamen chrysoptera* (Bloch and Schneider)

Balistes chrysopterus Bloch and Schneider, Syst. Ichth., p. 466, 1801.

Balistes niger Day, Fishes India, p. 688, pl. 181, fig. 1, 1878.

Hemibalistes chrysoptera Smith, Fishes of Southern Africa, p. 409, pl. 90, fig. 1164, 1949.

Hemibalistes chrysopterus Munro, Fishes Ceylon, p. 271, pl. 53, fig. 790, 1955. Klauswitz, Senck. biol., **55** (1/3), p. 49, fig. 7, 1974.

Specimen studied: Kavarathi (1), 122 mm.

D₁. III; D₂. ii, 25; A. ii, 22; P. i, 12.

Head 2.8 in standard length, 3.5 in total length. Depth of body 2.0 in standard length, 2.4 in total length. Eye 5.5 in head, 4.2 in snout and 1.5 in somewhat flat interorbital space. Snout profile almost straight. A groove present before eye below nostril. First dorsal spine 2.1 in head, third spine small. Pectoral about 3.2 in head. Caudal fin truncate. 7 rows of small tubercles on caudal peduncle not extending forward than posterior 3/5 of soft dorsal fin. All scales on cheek smaller than those on body. Colour: Head and body brown; lips pale; two pale cross bands on chin; membrane of first dorsal pale basally, dark brown distally; soft dorsal, anal and pectoral fins yellowish; caudal fin with upper and

lower rays white and broad white crescent shaped band along distal margin, middle part of fin dark brown.

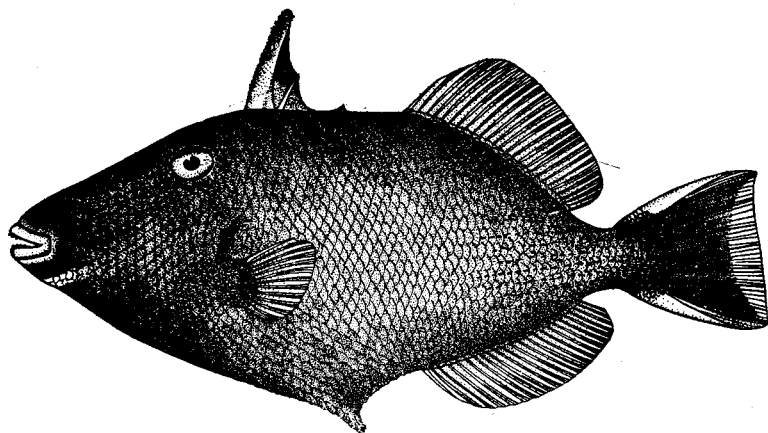


FIG. 568. *Sufflamen chrysoptera* (Bloch and Schneider), 122 mm.

Local name: *Chundam-karatti* (Kavarathi).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, India, Ceylon, Indonesia, Philippines and Caroline, Gilbert, Marshall, Mariana, Samoa and Society Islands.

569. *Balistoides viridescens* (Bloch and Schneider)

Balistes viridescens Bloch and Schneider, Syst. Ichth., p. 477, 1801. Day, Fishes of India p. 689, pl. 177, fig. 2, 1878. Regan, Trans. Linn. Soc. London, 12 (3), p. 252, 1908. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 287, 1962.

Balistoides viridescens Smith, Fishes of Southern Africa, p. 408, pl. 89, fig. 1160, 1949. Munro, Fishes of Ceylon, p. 271, pl. 53, fig. 788, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 154/475). Klauswitz, Senck. biol., 55 (1/3), p. 47, fig. 5, 1974.

Specimens studied: Agathi (3), 195 mm. Kadamat (2), 87 and 99 mm. Nicoy (6), 24 to 257 mm.

D₁. III; D₂. ii, 23-24; A. ii, 21-22; P. i, 13. Lat. 28-30 + 7-8; Ltr. 18-19.

Head 2.7-2.9 in standard length, 3.3-3.5 in total length. Depth of body 1.75-1.90 in standard length, 2.2-2.3 in total length. Eye 4.0-5.8 in head, 2.6-3.8 in snout and 1.3-1.8 in convex interorbital space. A deep groove before the eye. Front of first dorsal spine covered with small tubercles, its length slightly more than $\frac{1}{2}$ length of head, second spine slightly more than $\frac{1}{2}$ length of first spine and the third spine about $\frac{1}{3}$ of second spine. Second dorsal and

anal rounded, rather elevated, rays becoming shorter gradually to the last. Pectoral much shorter than $\frac{1}{2}$ length of head. Ventral spine movable, covered with tubercles and blunt spinules. Caudal rounded. Scales large, covered with small tubercles. Five longitudinal rows of short conical spines on posterior part of tail and caudal peduncle. Colour: Brownish olive, scales on sides each with a brown spot. A broad dark brown band connecting eyes over interorbital space, continued below eye over gill opening to base of pectoral. Lips and corner of mouth dark brown. Membrane of first dorsal with several brown spots or reticulations. Second dorsal light reddish brown, darker terminally. Anal light reddish brown. Caudal brownish, distal part with brown reticulations. Pectoral pale, slightly brownish at base.

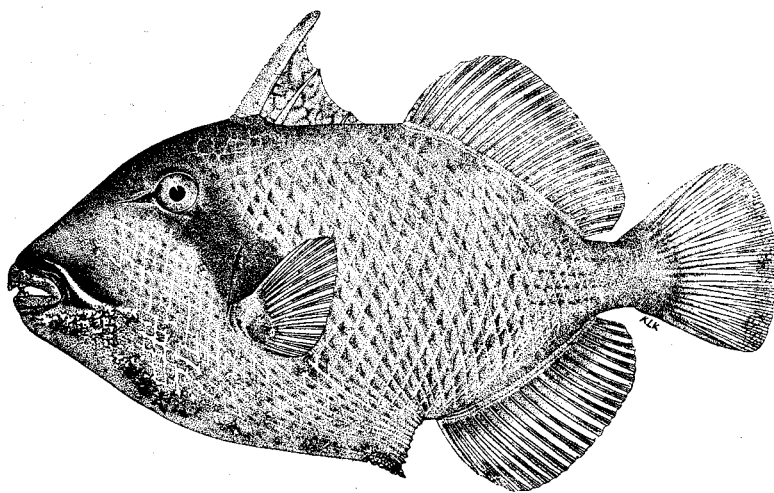


FIG. 569. *Balistoides viridescens* (Bloch and Schneider), 195 mm.

Local names: *Rondu* (Minicoy). *Palli* (other islands).

Distribution: East coast of South Africa, Red Sea, Laccadives, Maldives, Ceylon, Andamans, Indonesia, Philippines and Caroline, New Hebrides and Gilbert Islands and Queensland.

570. *Balistoides conspicillum* (Bloch and Schneider)

Balistes niger Bonnaterre, Tableau Encyclop. Ichth., p. 19, pl. 85, fig. 182, 1788 (not of Osbeck and not of Bloch).

Balistes conspicillum Bloch and Schneider, Syst. Ichth., p. 474, 1801. Day, Fishes of India, p. 689, 1878. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **11**, p. 288, 1962.

Balistoides conspicillum Smith, Fishes of Southern Africa, p. 408, pl. 90, fig. 1161, 1949. Smith and Smith, Fishes of Seychelles, p. 59, pl. 54, D, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 30, 1969 (Cat. No. CMFRI-LA-F. 154/476). Klausewitz, Senck. biol., **55** (1/3), p. 45, fig. 4, 1974.

Specimen studied: Bitra (1), 230 mm.

D₁. III; D₂. ii, 24; A. i, 21; P. i, 13. Llat. 36+6; Ltr. 30.

Head 3.0 in standard length, 3.5 in total length. Depth of body 1.9 in standard length, 2.2 in total length. Eye 5.3 in head, 3.7 in snout and 1.7 in slightly convex interorbital space. A deep groove in front of eye. Front of first dorsal spine covered with small tubercles, its length less than $\frac{2}{3}$ length of head, second spine half length of first spine, third spine slightly more than $\frac{1}{4}$ of second spine. Second dorsal and anal rounded, slightly elevated. Pectoral much less than half length of head. Ventral spine movable, covered with tubercles. Three rows of short conical spines on caudal peduncle and posterior part of tail. Colour: Dark bluish brown, slightly lighter on back from behind eye to origin of soft dorsal; a white band from middle of snout to lower border of eye; lips broadly white; a narrow white ring behind the mouth; lower part of cheeks, throat to base of caudal white with a few black spots; lower half of body and tail with large white blotches; caudal peduncle white; edges of all white areas narrowly yellowish. First dorsal dark brown; soft dorsal and anal yellowish; base, lower, upper and distal parts of caudal dark brown leaving the central part pale yellowish. Pectoral pale yellowish.

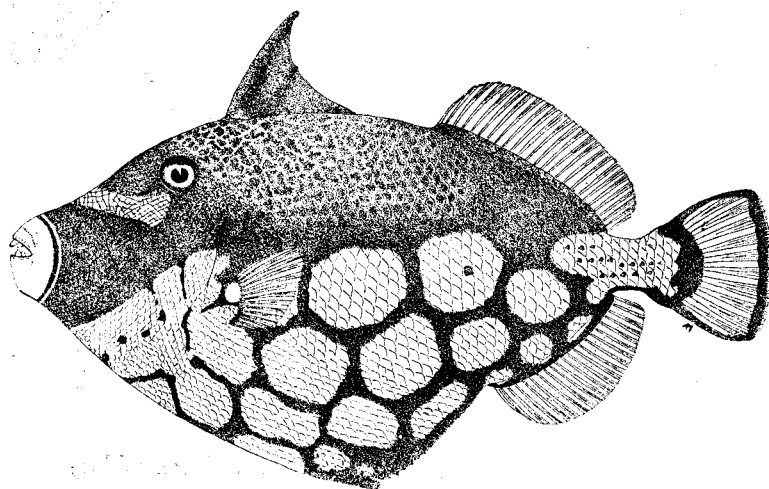


FIG. 570. *Balistoides conspicillum* (Bloch and Schneider), 230 mm.

Local name: *Karatti* (Bitra).

Distribution: East coast of Africa, Seychelles, Laccadives, Maldives, coasts of India, Indonesia, Philippines, China, Ryukyus, Japan and New Hebrides, Caroline and Fiji Islands.

571. *Pseudobalistes flavimarginatus* (Rüppell)

Balistes flavimarginatus Rüppell, Atlas Reise Nördl. Afrika, p. 33, 1828. Day, Fishes of India, p. 960, pl. 178, fig. 1, 1878. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 306, 1962.

Pseuobalistes flavimarginatus Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 154/477). Klausewitz, Senck. biol., 55 (1/5), p. 55, figs. 11 and 12, 1974.

Pseudobalistes flavomarginatus Smith, Fishes of Southern Africa, p. 409, text fig. 1167, 1949.

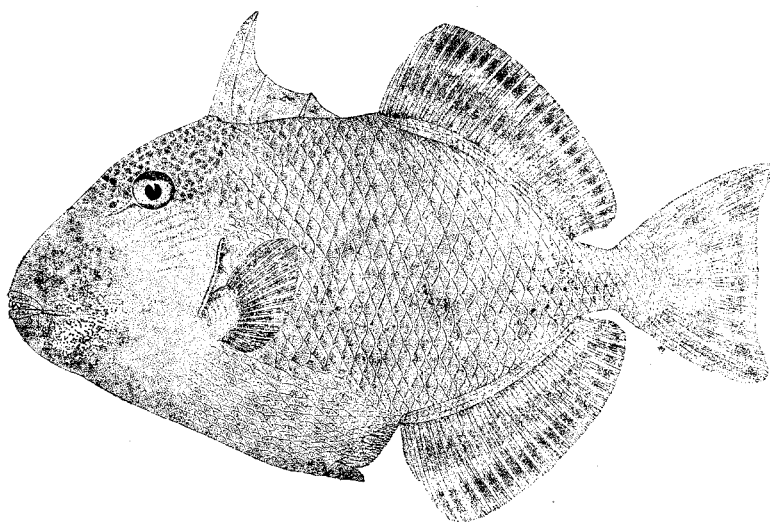


FIG. 571. *Pseudobalistes flavimarginatus* (Rüppell), 218 mm.

Specimens studied: Agathi (1), 218 mm. Minicoy (3), 100 to 130 mm.

D₁. III; D₂. ii, 23-25; A. ii, 21-23; P. i, 14. Llat. 29-30 + 7; Ltr. 19-21.

Head 2.7-2.8 in standard length, 3.4-3.5 in total length. Depth of body 1.65-1.80 in standard length, 2.2-2.3 in total length. Eye 4.3-5.3 in head, 2.8-3.6 in snout and 1.3-1.8 in highly convex interorbital space. A short groove in front of eye and a few shallow longitudinal depressions below the eye. Front of first dorsal spine with small tubercles, its length slightly more than $\frac{1}{2}$ length of head, second spine equal to $\frac{1}{2}$ length of first spine and third spine about $\frac{1}{4}$ of first spine. Second dorsal and anal rounded, rather high anteriorly, rays decreasing in length gradually to the last. Caudal rounded in young, emarginate and with produced marginal lobes in large specimens. Pectoral slightly shorter than half length of head. Ventral spine movable and covered with tubercles and

spinules. Scales large, smaller on head; cheeks largely naked anteriorly. Each scale covered with small tubercles. Posterior part of tail and caudal peduncle with 5 rows of small conical spines. Colour: Brownish, anterior and lower parts of head pale yellowish, each scale of sides with a brown spot. Membrane of first dorsal pale with 5 to 7 brownish spots. Basal half of second dorsal and anal brownish, distal half lighter with a submarginal brownish band. Caudal brownish with a lighter and another brownish vertical band posteriorly and distal margin clear. Pectoral brownish basally, becoming pale posteriorly.

Local names: *Rondu* (Minicoy). *Palli* (Agathi).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, Andamans, Indonesia, Philippines, Japan and Samoan, Society, Tuamotu and Marquesas Islands.

572. *Balistapus undulatus* (Mungo Park)

Balistes undulatus Mungo Park, Trans. Linn. Soc. London, 3, p. 37, 1797. Day, Fishes of India, p. 691, pl 177, fig. 4, 1878. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 207, 1962.

Balistapus undulatus Smith, Fishes of Southern Africa, p. 410, pl. 91, fig. 1171, 1949. Munro, Fishes of Ceylon, p. 272, pl. 53, fig. 792, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 154/478). Klausewitz, Senck. biol., 55 (1/3), p. 44, fig. 3, 1974.

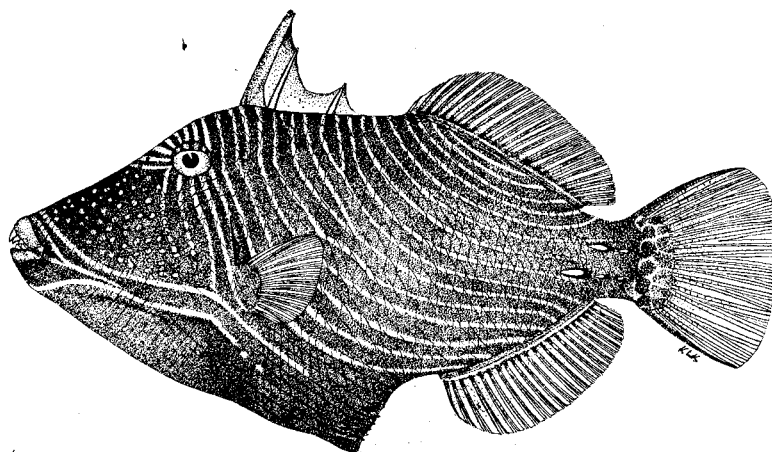


FIG. 572. *Balistapus undulatus* (Mungo Park), 155 mm.

Specimens studied: Agathi (2), 153 and 210 mm. Ameni (1), 181 mm. Bitra (2), 167 and 170 mm. Chetlat (1), 155 mm. Kalpeni (1), 170 mm. Kavarathi (5), 155 to 169 mm. Kiltan (1), 84 mm. Minicoy (9), 141 to 232 mm.

D₁. III; D₂. i-ii, 23-26; A. i, 21-23; P. i, 12 (13). Llat. 38-42+4-5; Ltr. 23-25.

Head 2.8-3.0 in standard length, 3.3-3.6 in total length. Depth of body 1.9-2.1 in standard length, 2.3-2.5 in total length. Eye 5.0-6.3 in head, 3.5-4.6 in snout and 1.3-1.6 in scarcely convex interorbital space. Profile of snout almost straight. First dorsal spine with small blunt tubercles in front, equal to or slightly longer than half length of head, second spine about $\frac{2}{3}$ length of first, third spine about $\frac{1}{2}$ length of second. Second dorsal and anal rounded, median rays longest. Pectoral rounded, equal to $\frac{2}{5}$ length of head. Ventral spine covered with blunt tubercles and with some spinules at tip. Caudal slightly rounded. Two longitudinal rows of 3 to 5 strong antrorse spines on caudal peduncle. Length of caudal peduncle 1.4-1.7 in its depth. Colour: Dark brown with 12 to 15 more or less parallel undulating and oblique yellow bands with reddish tinge from eye and back to anal and caudal fins; one band above the upper lip and another below lower lip joining behind corner of mouth and proceeding to above ventral, a black band often present below this band; snout with several yellowish spots. Base of caudal spines black. Interspinous membrane of first dorsal with dark brown margin. Other fins reddish yellow; base of rays of second dorsal and anal dark.

Local names: *Rondu* (Minicoy). *Karatti*, *Valupallan-karatti* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines, China and Caroline, Marshall, Samoan, Gilbert, Society, Tuamotu, Marquesas and Fanning Islands.

573. *Rhinecanthus rectangulus* (Schneider)

Balistes echarpe Lacépède, Hist. Nat. Poissons, 1, pp. 333 and 352, 1798. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 299, fig. 74, 1962.

Balistes rectangulus Bloch and Schneider, Syst. Ichth., p. 465, 1801. Day, Fishes of India, p. 691, pl. 178, fig. 2, 1878.

Rhinecanthus echarpe Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 154/479).

Rhinecanthus rectangulus Smith, Fishes of Southern Africa, p. 410, pl. 91, fig. 1170, 1949. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959. Klauswitz, Senck. biol., 55 (1/3), p. 59, figs. 15 and 16, 1974.

Specimens studied: Bitra (1), 156 mm. Kavarathi (1), 140 mm. Kalpeni (2), 97 and 105 mm. Minicoy (4), 97 to 107 mm. Suheli (1), 127 mm.

D₁. III; D₂. ii, 21-22; A. ii, 18-19; P. i, 12. Llat. 37-40+4-5; Ltr. 23-24.

Head 2.50-2.65 in standard length, 2.9-3.1 in total length. Depth of body 1.9-2.1 in standard length, 2.3-2.5 in total length. Upper profile of snout straight.

Eye 5.3-6.3 in head, 4.0-5.0 in snout and 1.3-1.5 in scarcely convex interorbital space. First dorsal spine equal to half length of snout, covered with small bony ridges and spinules, second spine equal to half length of first, third minute. Second dorsal and anal rounded, rays decreasing in length to the last. Pectoral equal to or a little longer than $1/3$ length of head. Caudal slightly rounded. Caudal peduncle and posterior part of tail with 4 or 5 longitudinal rows of antorse spines. Colour: Yellowish, back slightly dusky grey. Interorbital space bluish brown with 3 blackish bands connecting eyes. A bluish band over upper lip. A narrow dark band from anterior border of eye towards base of pectoral. A dark bluish brown band from eye to gill opening and base of pectoral, continued as a very broad band to the vent and base of anal, this band often bordered behind by a narrow bluish stripe; a narrow band from the middle to the end of base of second dorsal. A black angular band on the free portion of tail, the angle pointed forwards. Membrane of first dorsal dark brown. Second dorsal, anal and pectoral pale to yellowish. Caudal pale with brownish tinge.

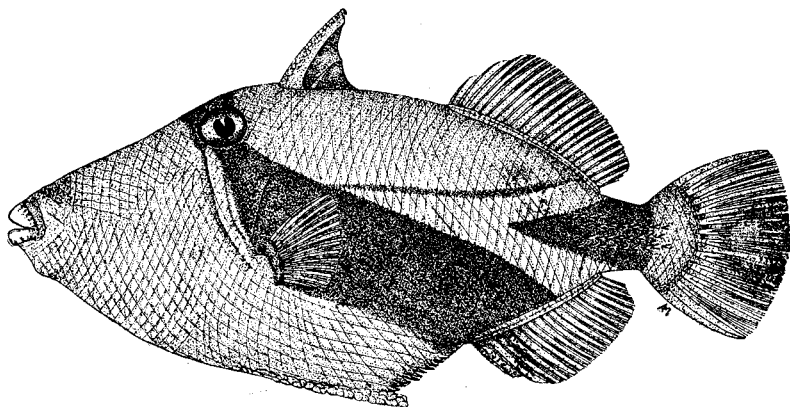


FIG. 573. *Rhinecanthus rectangulus* (Schneider), 140 mm.

Local names: *Furundu* (Minicoy). *Alikkaratti*, *Chikanna-karatti* (other islands).

Distribution: East coast of Africa, Laccadives, coasts of India, Maldives, Indonesia, Philippines and Gilbert, Samoan, Society, Tuamotu, Marquesas and Hawaiian Islands and Australia.

574. *Rhinecanthus aculeatus* (Linnaeus)

Balistes aculeatus Linnaeus, Syst. Nat., ed. 10, ¹p. 328, 1758, Day, Fishes of India, p. 690, pl. 178, fig. 3, 1878. Regan, Trans. Linn. Soc. London, 12 (3), p. 251, 1908. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 303, 1962.

Rhinecanthus aculeatus Smith, Fishes of Southern Africa, p. 410, pl. 91, fig. 1169, 1949. Munro, Fishes of Ceylon, p. 272, pl. 53, fig. 791, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 49, 1959. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959. Palmer, Ann. Mag. Nat. Hist., 5 (13), p. 502, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 154/480). Klausewitz, Senck. biol., 55 (1/3), p. 57, figs. 13 and 14, 1974.

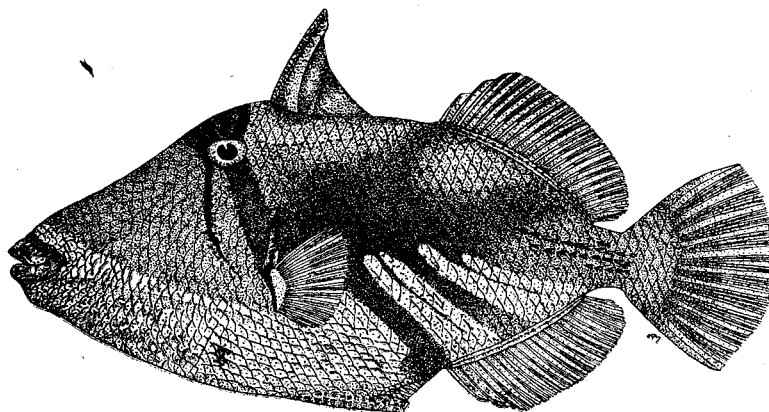


FIG. 574. *Rhinecanthus aculeatus* (Linnaeus), 132 mm.

Specimens studied: Agathi (2), 106 and 112 mm. Ameni (4), 22 to 128 mm. Bitra (3), 31 to 47 mm. Chetlat (2), 28 and 53 mm. Kavarathi (8), 100 to 132 mm. Minicoy (14), 48 to 173 mm. Suheli (2), 87 and 89 mm.

D₁. III; D₂. ii, 21-23; A. ii, 19-20; P. i, 12. Llat. 36-39 + 4-5. Ltr. 22-23.

Head 2.40-2.65 in standard length, 2.9-3.1 in total length. Depth of body 1.9-2.2 in standard length, 2.3-2.6 in total length. Eye 5.4-7.4 in head, 4.0-5.9 in snout and 1.5-1.8 in scarcely convex interorbital space. Upper profile of snout almost straight. First dorsal spine compressed, covered with coarse bony ridges and spinules on anterior side, its length equal to or slightly longer than half length of snout, second spine about half length of first, third spine minute. Second dorsal and anal slightly rounded, rays gradually decreasing in length to the last. Pectoral equal to or slightly longer than 1/3 of head. Ventral spine covered with tubercles and some strong spinules at its tip. Caudal rounded. Three longitudinal rows of anteriorly directed spines on posterior part of tail and caudal peduncle, the upper and middle rows having 9 to 14 spines and the lower one short, developed only on caudal peduncle of 3 to 7 spines. Colour: Pale greyish to yellowish white with a dark bluish brown broad band from gill opening backwards and upwards, bifurcating on body, one narrow branch to anterior and a broad band to posterior base of second dorsal and five narrow bands obliquely downwards to base of anal. Interorbital space bluish brown with

3 or 4 dark brown bands connecting eyes, a narrow dark band from eye to-wards front of base of pectoral and a broad dark band from eye to base of pect-oral. A pale bluish band over upper lip and a white band above it to below base of pectoral. First dorsal slightly dark, other fins yellowish.

Local names: *Furundu* (Minicoy). *Vellakkaratti* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India, Ceylon, Malaysia, Indonesia, Philippines, China, Japan and Caroline, Fiji, Marquesas and Hawaiian Islands and Australia.

Family MONACANTHIDAE

Highly compressed, ovoid or elongate. Mouth small, teeth not coalesced, an outer series of 6 teeth in each jaw and an inner row of 4 teeth in the upper. Two dorsals, the first with I or II spines, the second when present very small and consisting of simple rays. Anal similar to second dorsal. A single fused pelvic spine often present, movable or not. Gill openings small, restricted to the sides. Scales minute and modified with rough or spinous projections.

1. A fleshy barbel below symphysis of lower jaw. Very elongate. Dorsal spine slender. About 50 soft dorsal and about 60 anal rays
 *Psilocephalus barbatus*
 No fleshy barbel below lower jaw 2
2. First dorsal spine not fully erectile and developed in a loose flap of skin.
 No pelvic spine. Caudal peduncle with two rows of two antrorse spines.
 Four dark brown bands or saddles on sides of body and irregular dark brown spots on sides of head, body and tail *Paraluteres prionurus* ✓
 First dorsal spine erectile, locked by the second rudimentary spine 3
3. Pelvic spine absent. Ventral flap not developed. 48 or 49 anal rays. Dorsal spine long, slender, inserted over middle of eye; caudal peduncle deep; caudal fin longer than head. Greenish brown; irregular dark violet and bluish spots and streaks on head and body. Soft dorsal and anal yellowish.
 Caudal bluish brown *Osbeckia scripta*
 Pelvic spine present. Ventral flap somewhat developed; less than 40 anal rays 4
4. Snout produced, mouth dorsal; pelvic spine movable; dorsal spine above posterior half of eye with barbs on anterior and posterior borders. Bluish green with three longitudinal yellowish bands on snout and large yellowish blotches on sides. Caudal with dark vertical bar on median rays
 *Oxymonacanthus longirostris*
 Snout not produced; mouth terminal 5

5. Ventral spine immovable, short; origin of first dorsal spine before a level from the middle of eye. Gill openings below hind half of eye. First dorsal spine depressible in a groove. Light brown with indistinct brown spots separated by lighter interspaces and narrow brown stripes on head
 *Amaneses sandwichiensis*
 Ventral spine movable. First dorsal spine originating behind a level from the middle of eye 6
6. Depth of body 2.8 in length. Dorsal and anal concave. Brown with darker areas below anterior half of second dorsal and on caudal peduncle and indistinct dark lines on cheek *Paramonacanthus oblongus*
 Depth of body 2.3 in length. Dorsal and anal slightly convex. Upper profile of snout slightly concave. An indistinct dark area on body below anterior part of second dorsal. Caudal with two brownish cross bands
 *Paramonacanthus choirocephalus*

575. ***Psilocephalus barbatus*** (Gray)

Balistes (Anacanthus) barbatus Gray, Illustrations Indian Zoology, **1**, pl. 84, fig. 2, 1830-36.

Anacanthus barbatus Day, Fishes of India, p. 694, pl. 179, fig. 1, 1878. Munro, Fishes of Ceylon, p. 276, pl. 52, fig. 804, 1955.

Psilocephalus barbatus de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **11**, p. 344, fig. 80, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 30, 1969 (Cat. No. CMFRI-LA-F. 156/481).

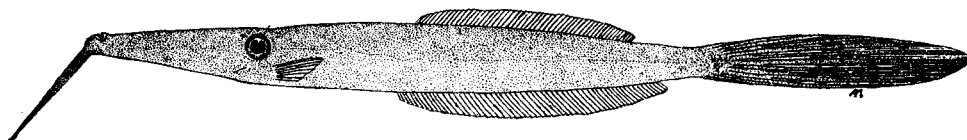


FIG. 575. *Psilocephalus barbatus* (Gray), 137 mm.

Specimen studied: Ameni (1), 137 mm.

D. 52; A. 59; P. 8.

Elongate, body strongly compressed. Tip of snout to hind end of gill opening 4.3 in standard length, 6.0 in total length. Depth of body about 9.0 in standard length, 12.4 in total length. Eye about 6 in snout. Gill opening almost horizontal, its hind part below front of eye. Fleshy barbel below symphysis of lower jaw tapering, its length one eye diameter shorter than head. Pectoral originating behind a level from the hind border of eye, its length equal to two eye diameter. Dorsal origin somewhat nearer to base of caudal than to tip of snout. Central rays of caudal longest. Colour: Dull brown. Dorsal, anal and pectoral yellowish. Caudal brown.

Distribution: Laccadives, coasts of India, Ceylon, Andamans, Indonesia, Malaysia, Philippines, Western Australia and Queensland.

576. *Paraluteres prionurus* (Bleeker)

Alutarius prionurus Bleeker, Nät. Tijds. Ned.-Ind., 2, p. 260, 1851.

Paraluteres prionurus de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 342, fig. 79, 1962. Smith and Smith, Fishes of Seychelles, p. 59, pl. 53, I, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 177, fig. 17, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 30, 1969 (Cat. No. CMFRI-LA-F. 156/482).

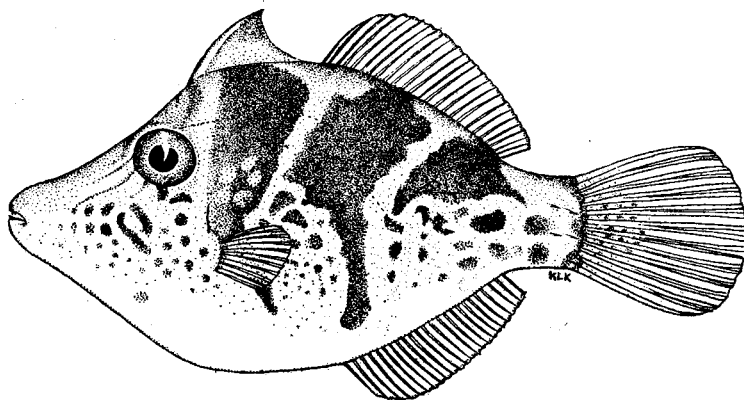


FIG. 576. *Paraluteres prionurus* (Bleeker), 39 mm. (after Jones and Kumaran)

Specimen studied: Minicoy (1), 39 mm.

D₁. I; D₂. 26; A. 24; P. 11.

Somewhat elongate and compressed. Head 3.0 in standard length, 3.8 in total length. Depth of body 1.9 in standard length, 2.4 in total length. Eye high up, 3.0 in head, 1.8 in snout and 1.2 in almost flat interorbital space. Gill opening a vertical slit above base of pectoral. First dorsal spine slender, curved and not fully erectile, 1.7 times eye diameter, its membrane reaching nearly to insertion of soft dorsal. Dorsal and anal fins slightly elevated anteriorly. Pectoral slightly longer than diameter of eye. Teeth not coalesced, the anterior pair larger than others. Two rows of two elongated slender spines on side of caudal peduncle. Colour: Slightly greenish grey on back, creamy on sides and below with four dark brown bands, the first from insertion of first dorsal to eye, the second from below first dorsal towards base of pectoral and extending as a line behind pectoral, the third from anterior half of soft dorsal narrowing and ending above insertion of anal and the fourth below hind rays of soft dorsal. Sides of head, body and tail with irregular dark brown spots. A brown blotch on membrane behind tip of first dorsal spine. Soft dorsal and anal hyaline, tips of rays dusky. Caudal brownish basally, pale distally.

Distribution: East coast of Africa, Seychelles, Minicoy in the Laccadives, Indonesia, Japan and Marshall and New Hebrides Islands.

577. *Osbeckia scripta* (Osbeck)

Balistes scriptus Osbeck, Iter. Chinensis, 1, p. 144, 1757.

Alutera scripta de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 339, 1962. Munro, Fishes of Ceylon, p. 275, pl. 52, fig. 803, 1955.

Monacanthus scriptus Day, Fishes of India, p. 694, pl. 176, fig. 3, 1878.

Osbeckia scripta Smith, Fishes of Southern Africa, p. 406, pl. 89, fig. 1153, 1949. Smith and Smith, Fishes of Seychelles, p. 59, pl. 53, K, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 156/483).

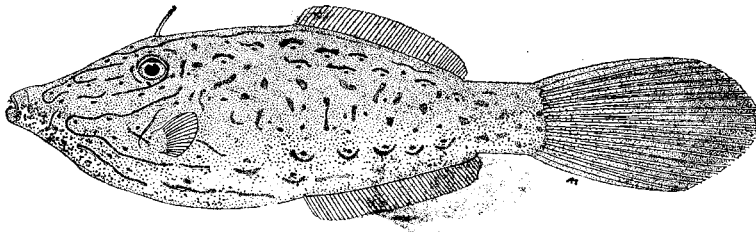


FIG. 577. *Osbeckia scripta* (Osbeck), 335 mm.

Specimens studied: Agathi (2), 405 and 415 mm. Kavarathi (1), 275 mm. Minicoy (4), 62 to 335 mm.

D₁. I; D₂. 46; A. 48-49; P. i, 13.

Head 3.2-3.4 in standard length, 4.4-4.8 in total length. Depth of body 2.8-3.0 in standard length, 3.9-4.4 in total length. Eye 6.0-6.6 in head, 5.3-5.8 in snout and 1.4-1.6 in keeled interorbital space. Snout produced with concave upper profile. Lower jaw projecting beyond the upper, chin prominent. Gill opening oblique, its hind end below posterior third of eye. First dorsal spine above middle of eye and very rough anteriorly and on sides, its length being more than twice eye diameter. Soft dorsal and anal low. Teeth compressed and pointed, those near symphysis of lower jaw and lateral ones in upper jaw very broad. Pectoral less than two eye diameter in length. Caudal slightly longer than head. Depth of caudal peduncle equal to or a little more than 2/5 of head. Colour: Greenish brown; lower part of head and breast with 4 or 5 bluish violet lines and irregular dark violet and bluish spots and streaks on head and body. Soft dorsal and anal yellowish. Caudal bluish brown especially towards the distal part.

Local name: *Fathi-rundu* (Minicoy).

Distribution: All warm seas.

578. *Oxymonacanthus longirostris* (Bloch and Schneider)

Balistes hispidus var. *longirostris* Bloch and Schneider, Syst. Ichth., p. 464, 1801.

Oxymonacanthus longirostris Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 336, fig. 76, 1962. Smith and Smith, Fishes of Seychelles p. 57, pl. 98, E, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 156/484).

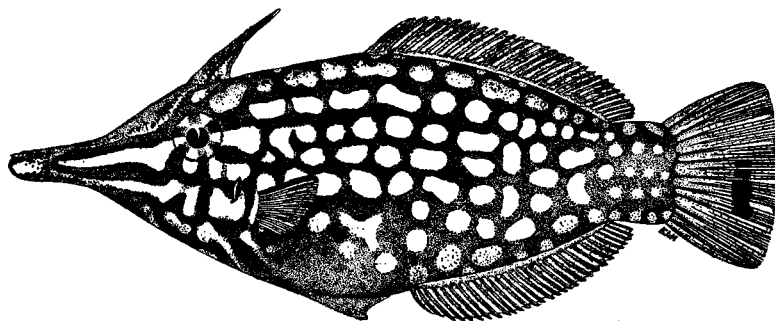


FIG. 578. *Oxymonacanthus longirostris* (Bloch and Schneider), 72 mm.

Specimens studied: Agathi (2), 66 and 71 mm. Minicoy (6), 27 to 72 mm.

D₁. II; D₂. 31-32; A. 29-30; P. 11.

Head 2.7-2.9 in standard length, 3.2-3.4 in total length. Depth of body 2.7-2.8 in standard length, 3.2-3.3 in total length. Eye 4.4-4.7 in head, 2.9-3.3 in snout and 1.1-1.2 in convex interorbital space. Elongate and compressed, snout long, mouth dorsal. First dorsal spine above middle of eye, fully erectile, with barbs directed upwards on its anterior side and directed downwards on its posterior side, length of spine less than $\frac{3}{5}$ of head. Second dorsal spine inconspicuous. Pectoral equal to $\frac{1}{4}$ of eye diameter. Ventral spine covered with spinules. Caudal slightly rounded. Caudal peduncle short, 2.1-2.3 in its depth. Scales very small, with backwardly directed spinules. Colour: Bluish green with three longitudinal yellowish bands on snout and yellowish round blotches on sides. Dorsal, anal and caudal fins clear; caudal with a dark vertical bar posteriorly on median rays.

Local names: *Thundigu-kalihi* (Minicoy). *Chundan-karatti* (Agathi).

Distribution: East coast of Africa, Seychelles, Laccadives, Indonesia, Philippines and Solomon, Samoan, Fiji, Gilbert, New Caledonia and Tonga Islands and Queensland.

579. *Amaneses sandwichiensis* (Quoy and Gaimard)

Balistes sandwichiensis Quoy and Gaimard, Voy. *Uranie*, Zoology, p. 214, 1824.

Amaneses pardalis Munro, Fishes of Ceylon, p. 275, pl. 53, fig. 801, 1955.

Amaneses sandwichiensis Smith, Fishes of Southern Africa, p. 403, pl. 88, fig. 1144 and text fig. 1144, 1949. Balan, J. Bombay nat. Hist. Soc., **55**, p. 303, 1958. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 31, 1969 (Cat. No. CMFRI-LA-F. 156/485).

Monacanthus sandwichiensis de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **11**, p. 332, fig. 75, 1962.

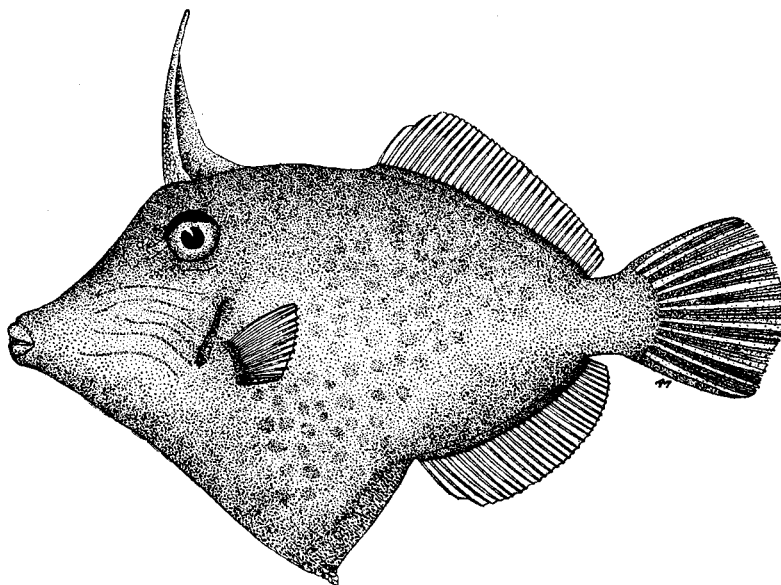


FIG. 579. *Amaneses sandwichiensis* (Quoy and Gaimard), 92 mm.

Specimens studied: Kadamat (2), 60 and 61 mm. Kavarathi (1), 92 mm. Minicoy (1), 60 mm.

D₁. II; D₂. 33-35; A. 30-31; P. 13-14.

Head 3.0-3.1 in standard length, 3.7-3.8 in total length. Depth of body at origin of dorsal 2.1-2.3 in standard length, 2.6-2.8 in total length. Dorsal profile of head slightly concave. Eye 3.8-4.3 in head, 2.8-3.3 in snout and 1.0-1.2 in interorbital space. Gill opening below hind part of eye. Origin of first dorsal above anterior part of eye, its length more than snout, with minute tubercles. Second dorsal spine minute. Dorsal spine retractable in a groove when depressed. Pectoral 1.6-1.7 of eye diameter. Ventral spine immovable, short and covered with spinules. Colour: Variable; generally light brown, sides with indistinct brown spots separated by lighter interspaces and narrow brown stripes on head. Second dorsal, anal and pectoral hyaline. Caudal pale.

Local names: *Kuthi-kalihi* (Minicoy). *Karatti* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Ceylon, Indonesia Philippines and Society, Marquesas and Hawaiian Islands and Australia.

580. *Paramonacanthus oblongus* (Temminck and Schlegel)

Monacanthus oblongus Temminck and Schlegel, Fauna Japonica, Pisces, p. 291, pl. 130, fig. 2, 1846. Regan, Trans. Linn. Soc. London, 12 (3), p. 252, 1908.

? *Monacanthus curtiorhynchus* Bleeker, Nat. Tijds. Ned-Ind., 8, p. 430, 1855. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 322, 1962.

? *Paramonacanthus barnardi* Fraser-Brunner, Ann. Mag. Nat. Hist., (11), 8, p. 193, fig. 6, 1941. Smith, Fishes of Southern Africa, p. 402, pl. 88, fig. 1139, 1949.

Paramonacanthus oblongus Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 178, fig. 18, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 156/486).

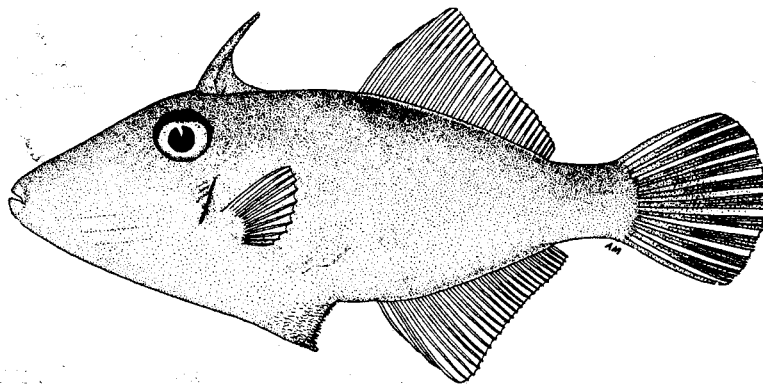


FIG. 580. *Paramonacanthus oblongus* (Temminck and Schlegel), 77 mm.
(after Jones and Kumaran)

Specimen studied: Kavarathi (1), 77 mm.

D₁. II; D₂. 28; P. 11.

Dorsal profile of head almost straight. Head 3.0 in standard length, 3.7 in total length. Depth of body 2.8 in standard length, 3.4 in total length. Eye 3.5 in head, 2.5 in snout and 0.9 in convex interorbital space. Gill opening below hind border of eye, its upper edge less than an eye diameter from eye. First dorsal spine about twice in head, originating behind a level from the middle of eye, its anterior surface with granulations, the postero-lateral edges with 6 downwardly directed short barbs. Second spine minute. Dorsal and anal falcate; longest rays of dorsal about 1.8, longest rays of anal about twice in head. Pectoral 2.3 in head. Pelvic shield short. Pelvic spine slender and movable with small

spinules. Middle rays of caudal longest. Scales with basal plate bearing 2 to 4 spinules. Colour: Brown with darker areas below anterior half of second dorsal and on caudal peduncle and indistinct dark lines on cheek. Dorsal, anal and pectoral pale hyaline. Caudal pale at base and margin, brownish in the middle.

Distribution: East coast of Africa, Seychelles, Persian Gulf, Laccadives, Maldives, Indonesia, Japan and Marshall Islands and Queensland.

581. *Paramonacanthus choirocephalus* (Bleeker)

Monacanthus choirocephalus Bleeker, Verh. Bat. Gen., 24, p. 19, 1852. Day, Fishes of India p. 693, pl. 179, fig. 3, 1878. Regan, in Gardiner, J. S., The fauna and geography of the Maldiv and Laccadive Archipelagoes, 1, p. 279, 1903. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 325, 1962.

Paramonacanthus choirocephalus Munro, Fishes of Ceylon, p. 274, pl. 53, fig. 799, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 156/487).

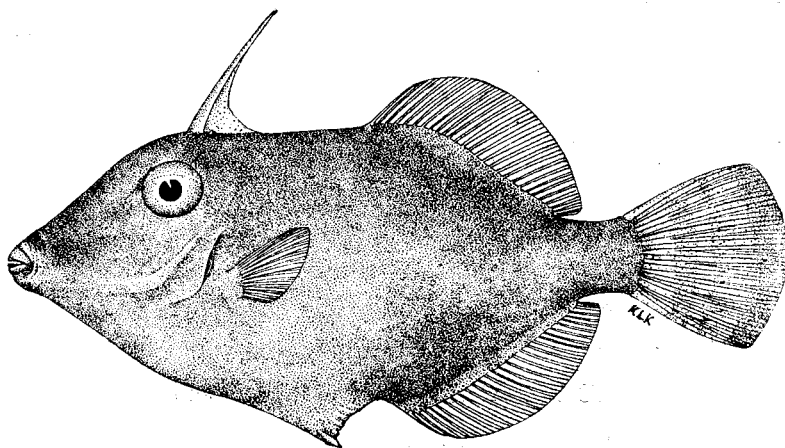


FIG. 581. *Paramonacanthus choirocephalus* (Bleeker), 68 mm.

Specimen studied: Kalpeni (1), 68 mm.

D₁. II; D₂. 28; A. 29; P. 12.

Head 3.0 in standard length, 3.7 in total length. Depth of body 2.3 in standard length, 2.8 in total length. Eye 3.3 in head, 2.2 in snout and slightly more than interorbital space. Dorsal profile of snout slightly concave. Gill opening somewhat oblique, the upper end below hind border of eye. First dorsal spine above posterior half of eye, its anterior border rough and with two rows of barbs posteriorly, its length equal to snout. Second dorsal spine minute. Outer border of dorsal and anal slightly convex. Pelvic spine movable, with some spinules at its end. Colour: Brownish, with an indistinct dark blotch on

body below anterior part of soft dorsal. Second dorsal, anal and pectoral hyaline. Caudal with two brownish cross bands.

Distribution: Kalpeni in the Laccadives, Maldives, coasts of India, Ceylon, Malaysia, Indonesia and Indo-China.

Family OSTRACIONTIDAE

Head and body encased in an armour of large marginally fused bony plates, leaving the caudal peduncle free. Body with two dorso-lateral ridges and two ventro-lateral or pelvic ridges and sometimes a median dorsal ridge. Teeth not fused, about ten in each jaw. Dorsal and anal fins consisting of soft rays only. No ventral fins.

1. A forwardly directed spine before eye. Pelvic ridge ending posteriorly in a backwardly directed spine. Dorsal ridge without spines
..... *Lactoria cornuta*
No spines on carapace 2
2. Dorsal ridge well developed. A projection above mouth followed by a concave profile. Anal behind a vertical from dorsal origin
..... *Rhynchostracion nasus*
Dorsal ridge absent 3
3. Brown with black spots on bony plates. Anterior opening of carapace as long as eye diameter *Ostracion tuberculatus*
Anterior opening of carapace more than 1.5 eye diameter. Dark brown with white spots all over head, body and caudal peduncle
..... *Ostracion meleagris*

582. *Lactoria cornuta* (Linnaeus)

Ostracion cornutus Linnaeus, Syst. Nat., ed. 10, p. 331, 1758. Day, Fishes of India, p. 697, pl. 176, fig. 4, 1878. Regan, in Gardiner, J. S., The fauna and geography of the Maldivian and Laccadive Archipelagoes, 1, p. 279, 1903. Regan, Trans. Linn. Soc. London, 12 (3), p. 252, 1908. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 350, fig. 81, 1962.

Lactoria cornuta Munro, Fishes of Ceylon, p. 277, pl. 54, fig. 807, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 158/488).

Lactoria cornutus Smith, Fishes of Southern Africa, p. 413, pl. 92, fig. 1178, 1949.

Specimens studied: Ameni (1), 48 mm. Androth (3), 47 to 60 mm. Minicoy (1), 100 mm. Suheli (4), 38 to 47 mm.

D. i, 8; A. i, 8; P. 11.

Carapace four ridged and generally a feeble spine on middle of back. Head 2.9-3.1 in standard length, 3.7-3.9 in total length. Eye 2.5-2.6 in head, 1.4-1.5 in snout and less than 2.0 in concave interorbital space. Profile of snout

almost vertical. Gill opening a little more than half eye diameter. Lateral and pelvic ridges rounded. Long and slender supraorbital spine directed forward and upward. Pelvic ridge terminating posteriorly in a backwardly directed spine. Caudal long, the rays bifurcate. Colour: Brownish to greenish brown with some round bluish spots on bony plates. Fins light yellowish, caudal sometimes with bluish spots.

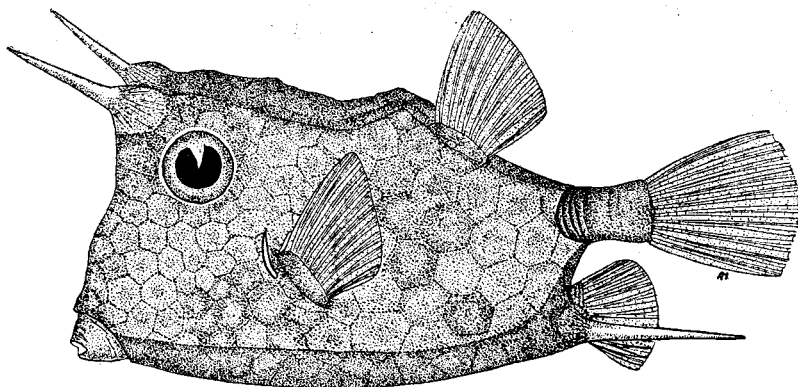


FIG. 582. *Lactoria cornuta* (Linnaeus), 47 mm.

Local names: *Garibo* (Minicoy). *Komban*, *Tharathombu* (other islands).

Distribution: East coast of Africa, Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines, Japan and Society, Tuamotu, Marquesas and Hawaiian Islands and Australia.

583. *Rhynchostracion nasus* (Bloch)

Ostracion nasus Bloch, Naturges. Ausl nd. Fische, p. 118, pl. 138, 1785. Day, Fishes of India, p. 696, 1878. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 353, 1962.

Rhynchostracion nasus Munro, Fishes of Ceylon, p. 277, pl. 54, fig. 810, 1955. Smith and Smith, Fishes of Seychelles, p. 59, pl. 98, F, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 158/489).

Specimens studied: Agathi (1), 18 mm. Ameni (1), 104 mm. Androth (1), 120 mm. Minicoy (1), 69 mm.

D. i, 8; A. i, 8; P. i, 9.

Head 3.7-3.9 in standard length, 4.6-4.9 in total length. Depth of body 3.0-3.1 in standard length, 3.7-3.8 in total length. Eye 2.8-3.0 in head, 1.7-1.9 in snout and twice in concave interorbital space. A hump above mouth. Body five ridged, the lateral and pelvic ridges well developed. Both sides of

the distinct dorsal ridge along the median line of back concave. Pectoral rounded, longest ray 1.6-1.7 in head. Longest dorsal ray 1.7-1.8 and longest anal ray 1.8-1.9 in head. Colour: Yellowish brown with a large dark spot generally in each scute; ventral side, free portion of caudal peduncle and caudal fin whitish. Dorsal, anal and pectoral light yellowish.

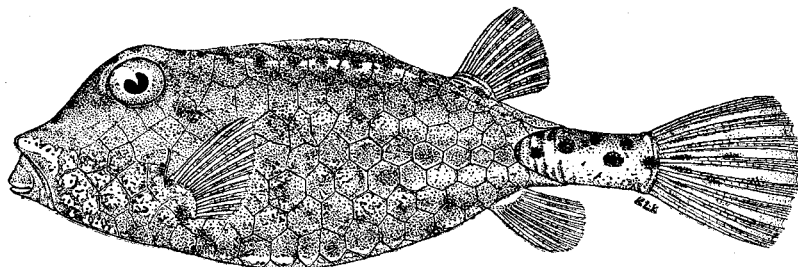


FIG. 583. *Rhynchostracion nasus* (Bloch), 104 mm.

Local names: *Gonu* (Minicoy). *Thombu* (other islands).

Distribution: East coast of Africa, Seychelles, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Palau, Caroline, Society and Marquesas Islands, Western Australia and Queensland.

584. *Ostracion tuberculatus* Linnaeus

Ostracion tuberculatus Linnaeus, Syst. Nat., ed. 10, p. 331, 1758. Smith, Fishes of Southern Africa, p. 412, pl. 92, fig. 1177 and text fig. 1177, 1949. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **11**, p. 355, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., **8**, p. 31, 1969 (Cat. No. CMFRI-LA-F. 158/490). Klauswitz, Senck. biol., **54** (1/3), p. 41, figs. 2 and 3, 1973.

Ostracion cubicus Day, Fishes of India, p. 696, pl. 181, fig. 3, 1878.

Ostracion tuberculata Munro, Fishes of Ceylon, p. 277, pl. 54, fig. 208, 1955.

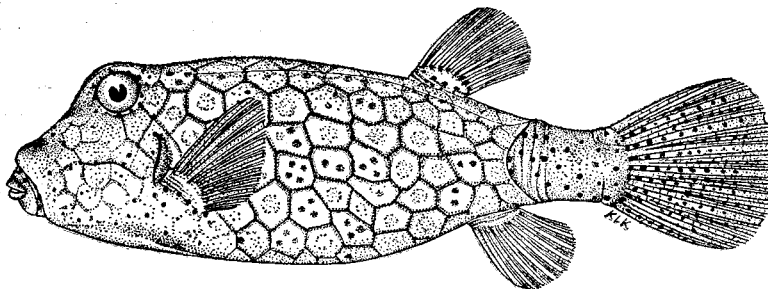


FIG. 584. *Ostracion tuberculatus* Linnaeus, 140 mm.

Specimens studied: Agathi (2), 230 and 270 mm. Bitra (2), 205 and 257 mm. Kiltan (1), 169 mm. Minicoy (8), 105 to 390 mm. Suheli (1), 212 mm.

D. i, 8 (9); A. i, 8; P. i, 9.

Head 3.7-4.1 in standard length, 4.8-5.1 in total length. Depth of body 2.7-3.0 in standard length, 3.6-3.9 in total length. Eye 3.0-3.3 in head, 1.7-1.8 in snout and 2.7-2.9 in concave interorbital space. Dorsal profile of snout somewhat concave with a hump above mouth. Body four ridged, pelvic ridges more prominent than the lateral ones. Anterior opening of carapace equal to or less than diameter of eye. Longest pectoral rays about 1.3-1.4 in head. Longest rays of dorsal and anal 1.5-1.8 in head. Colour: Brownish to yellowish with numerous black spots on head, bony plates of body with one or two or exceptionally three black spots. Caudal peduncle, caudal and bases of dorsal and pectoral usually with black spots. Fins yellowish.

Local names: *Gonu* (Minicoy). *Thombu* (other islands).

Distribution: East coast of Africa, Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines, Japan, Australia and Mariana, Marshall, Society and Hawaiian Islands.

585. *Ostracion meleagris* Shaw

Ostracion meleagris Shaw, Nat. Miscell., 7, pl. 253, 1796. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 356, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 158/491). Klausewitz, Senck. biol., 54 (1/3), p. 44, fig. 4, 1973.

Ostracion lentiginosa Munro; Fishes of Ceylon, p. 277, pl. 54, fig. 809, 1955.

Ostracion lentiginosum Smith, Fishes of Southern Africa, p. 412, pl. 92, fig. 1176, 1949.

Ostracion punctatus Day, Fishes of India, p. 696, pl. 181, fig. 2, 1878.

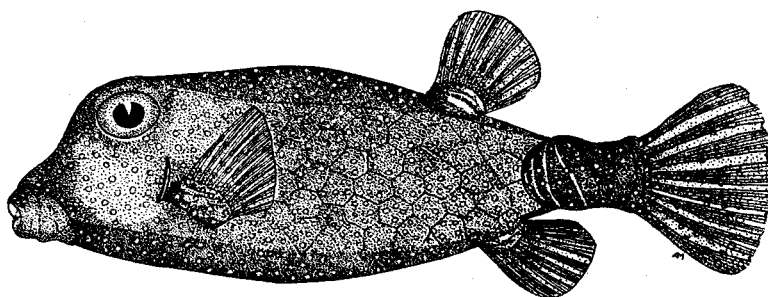


FIG. 585. *Ostracion meleagris* Shaw, 145 mm.

Specimens studied: Kadamat (1), 75 mm. Kavarathi (3), 120 to 188 mm.

D. i, 8; A. i, 8; P. i, 9.

Head 3.8-3.9 in standard length, 4.6-4.7 in total length. Depth of body 2.9-3.2 in standard length, 3.6-3.9 in total length. Eye 2.5-3.0 in head, 1.8-2.1 in snout and 2.3-2.5 in slightly concave interorbital space. Body four ridged.

ed, pelvic ridges being more prominent. Anterior opening of carapace less than diameter of eye. Longest rays of dorsal and anal 1.6-1.9 in head. Pectoral rays 1.5-1.6 in head. Colour: Dark brown with numerous white spots all over head, body, caudal peduncle and caudal fin. Fins brownish, sometimes pale white spots on basal half of dorsal and anal. White spots on ventral side confluent forming wavy lines in large specimens.

Local name: *Thombu* (other islands).

Distribution: East coast of Africa, Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines and Fiji, Samoan, Society, Tuamotu, Johnston and Hawaiian Islands.

Family DIODONTIDAE

Body highly inflatable and covered with strong spines. Teeth fused in each jaw, without distinct suture in front. Nostrils in a compressed tubular papilla. Dorsal and anal fins of soft rays only. Ventrals absent.

Longest spines on sides of body much longer than eye diameter. Back, sides of body and fins except anal with small black spots *Diodon hystrix*

Longest spines on sides of body scarcely exceeding eye diameter. Large black blotches bordered by yellow on nape, before dorsal, above pectoral and below dorsal. Spines on back and sides with black spots at base

. *Lophodiodon calori*

586. *Diodon hystrix* Linnaeus

Diodon hystrix Linnaeus, Syst. Nat., ed. 10, 1, p. 335, 1758. Day, Fishes of India, p. 708, pl. 179, fig. 4, 1878. Smith, Fishes of Southern Africa, p. 415, fig. 1182, 1949. Munro, Fishes of Ceylon, p. 278, pl. 54, fig. 812, 1955. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 412, fig. 88, 1962. Smith and Smith, Fishes of Seychelles, p. 59, pl. 55, 0, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 159/492).

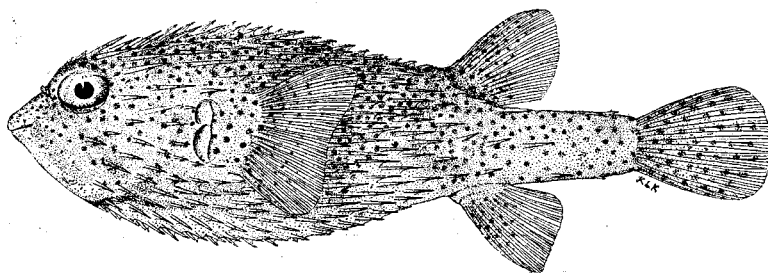


FIG. 586. *Diodon hystrix* Linnaeus, 320 mm.

Specimens studied: Bitra (1), 315 mm. Minicoy (3), 250 to 320 mm.

D. ii, 13; A. ii, 13; P. i, 22.

Head 2.8-3.0 in standard length, 3.3-3.6 in total length. Eye 4.5-5.0 in head, 1.3-1.6 in snout and 3.3-3.8 in slightly concave interorbital space. Nostril a compressed tube with openings on both sides. Spines two rooted except some on posterior part of back and sides. Most spines movable. 3 or 4 spines above eye, 16 or 17 series of spines from snout to dorsal origin. Spines on forehead equal to or slightly longer than eye, those behind pectoral longer, 1.5-1.8 eye diameter. Pectoral as long as half length of head. Longest dorsal rays 1.7-2.1 of eye diameter, longest anal rays as long as those of dorsal. Colour: Brownish above, white below; back and sides covered with small black spots; corner of mouth dark, a dark bar below eye and another in front of gill opening; brownish band from lower edge of gill opening to throat joining a similar band from the other side. Fins pale with black spots.

Local names: *Kari-koli* (Minicoy). *Veerkunnon*, *Mullan-chamanian* (other islands).

Distribution: Circumtropical.

587. *Lophodiodon calori* (Bianconi)

Diodon calori Bianconi, Mem. Ac. Sc. Inst. Bonon, 6, p. 145, 1855.

Lophodiodon calori Smith, Fishes of Southern Africa, p. 415, pl. 92, fig. 1184, 1949. Smith and Smith, Fishes of Seychelles, p. 59, pl. 55, N, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 159/493).

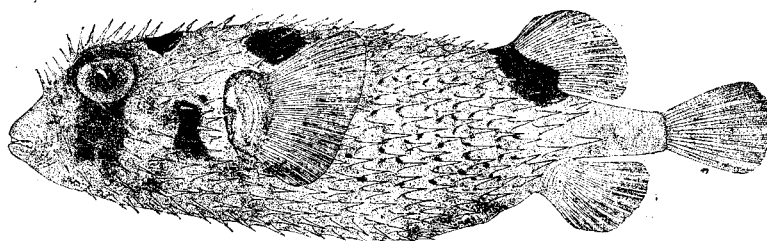


FIG. 587. *Lophodiodon calori* (Bianconi), 245 mm.

Specimens studied: Kadamat (3), 180 to 230 mm. Minicoy (8), 150 to 260 mm.

D. ii, 12-13; A. ii, 12; P. i, 22-23.

Head 2.6-2.7 in standard length, 3.00-3.15 in total length. Eye 3.8-4.4 in head, 1.3-1.5 in snout and 2.7-3.2 in slightly concave interorbital space. Jaws without median suture. Nasal organ a compressed tube with a pair of lateral openings. Pectoral shorter than half length of head. Longest dorsal rays 1.5 eye diameter, longest anal rays 1.7-1.8 eye diameter. Spines stiff; those in front of head erectile and two rooted, rest of the spines three rooted. 3 or 4

spines above each eye. 17 to 20 series of spines between snout and dorsal origin. Spines shorter than eye diameter except a few behind base of pectoral, these being as long as eye diameter. Colour: Brownish on back becoming white below. Corner of mouth dark, a blackish bar below eye and one in front of gill opening; an elongate median black blotch edged yellow on nape, another median blotch before dorsal and one above pectoral, dorsal in a similar black blotch. Most of the spines on back and sides with a black spot at base. Fins yellowish.

Distribution: East coast of Africa, Seychelles, Laccadives, Indonesia, Philippines and Hawaiian Islands.

Family CANTHIGASTERIDAE

Body rather compressed, moderately inflatable and with a median longitudinal ridge on back. Snout long and pointed. Nostrils inconspicuous. Lateral line absent. Teeth coalesced with a median suture in front of each jaw, forming a beak. Dorsal and anal fins consisting of soft rays only. No ventrals. Skin rather rough; head, body and tail generally covered with minute spines.


1. Dorsal rays i, 10; anal rays i, 9. Dark stripes radiating from eye and narrow stripes on snout; cheeks with dark spots; back and sides with pale spots each with a small dark dot in the centre. Bases of dorsal, anal and pectoral blackish *Canthigaster amboinensis*
Dorsal rays i, 8-9; anal rays i, 8 (9) 2
2. Four dark brown cross bands on back; snout with somewhat vertical stripes; sides of head, body and tail with brown spots
..... *Canthigaster cinctus*
No dark cross bands on back. A large dark ocellus at dorsal base 3
3. Dorsal rays i, 8. Depth of caudal peduncle more than its length. Bluish lines on upper part of head and back, and bluish ocelli on cheeks, sides of body and tail *Canthigaster margaritatus*
Dorsal rays i, 9. Caudal peduncle longer than deep. Head, back and sides with bluish black spots; spots on head intermingled with pale spots; blackish streaks on cheek edged white *Canthigaster bennetti*

588. *Canthigaster amboinensis* (Bleeker)

Psilonotus amboinensis Bleeker, Ned. Tijds. Dierk., 2, pp. 180 and 272, 1865.

Canthigaster amboinensis Smith, Fishes of Southern Africa, p. 421, 1949. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 364, 1962. Smith and Smith, Fishes of Seychelles, p. 61, pl. 56, E, 1963. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 179, fig. 19, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 160/494).

Specimen studied: Minicoy (1), 52 mm.

D. i, 10; A. i, 9; P. 15. 

Moderately compressed, back slightly keeled. Head 2.7 in standard length, 3.4 in total length. Depth of body 2.1 in standard length, 2.6 in total length. Eye 4.0 in head, 2.3 in snout and 1.6 in slightly concave interorbital space. Nostrils minute with a low rim. Minute spines on head and body, those on body inconspicuous. Caudal somewhat rounded. Colour: Dark olive, somewhat lighter below. Sides of snout with some oblique narrow dark stripes breaking up into spots below eye. Some dark stripes radiating from eye. Back, sides of body and tail with pale spots each with a small black dot in the centre. Bases of dorsal, anal and pectoral dark, the fins hyaline. Caudal dark.

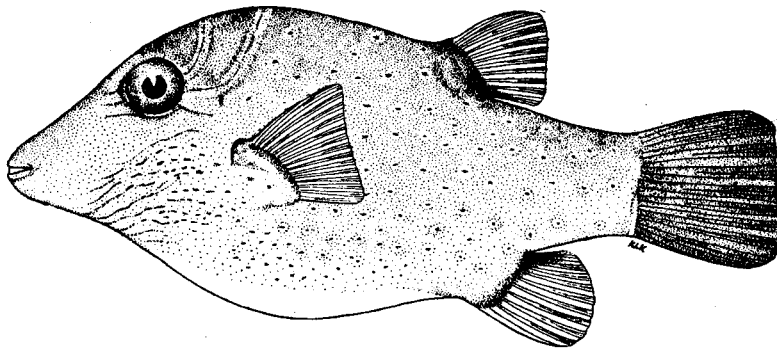


FIG. 588. *Canthigaster amboinensis* (Bleeker), 52 mm. (after Jones and Kumaran)

Local name: *Thundigu-koli* (Minicoy).

Distribution: Natal coast, Seychelles, Minicoy in the Laccadives, Indonesia, Philippines, Japan and Marshall, Gilbert, Fiji, Samoan and Hawaiian Islands.

589. *Canthigaster cinctus* (Richardson)

Tetraodon cinctus Richardson, Voy. Samarang, Ichth., pp. 19 and 20, 1848.

Tetraodon Valentyni Bleeker, Nat. Tijds. Ned.-Ind., 4, p. 130, 1853.

Canthigaster cinctus Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 160/495).

Canthigaster valentini Smith, Fishes of Southern Africa, p. 420, pl. 94, fig. 1208, 1949. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 366, 1962. Smith and Smith, Fishes of Seychelles, p. 61, pl. 56, B, 1963.

Specimen studied: Minicoy (1), 32 mm.

D. i, 8; A. i, 8; P. 16.

Body moderately compressed, back with somewhat developed keel. Head 2.35 in standard length, 3.10 in total length. Depth of body 2.25 in standard length, 2.90 in total length. Eye 3.8 in head, about 2.0 in snout and 1.3 in

slightly concave interorbital space. Nostrils minute with a low rim. Minute spines on head, body and tail. Dorsal, anal and caudal slightly rounded. Pectoral truncate. Colour: Pale above, creamy on sides and below with four blackish brown cross bands on back, the first from behind eye obliquely upwards, the second from back to upper edge of gill opening, the third in front of dorsal ending below middle of side and the fourth on dorsal side of caudal peduncle. A narrow blackish brown stripe downwards from lower edge of gill opening. Snout with 8 or 9 narrow brown vertical stripes; sides of head, body and tail with brown spots. Fins yellowish; the base and upper and lower edges of caudal blackish.

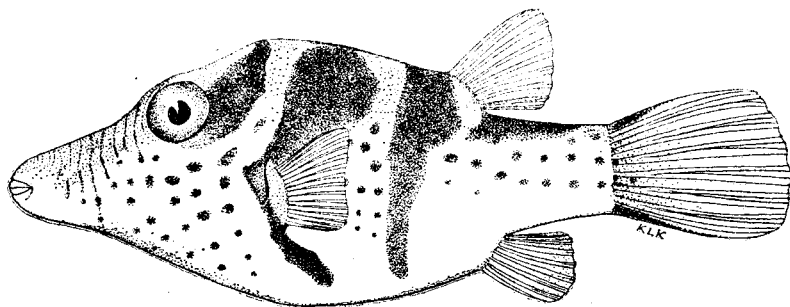


FIG. 589. *Canthigaster cinctus* (Richardson), 32 mm.

Local name: *Thundigu-koli* (Minicoy).

Distribution: East coast of Africa, Seychelles, Gulf of Aden, Minicoy in the Laccadives, Maldives, Indonesia, Philippines, Japan and Palau, Solomon, Samoa, Society and Hawaiian Islands and Queensland.

590. *Canthigaster margaritatus* (Rüppell)

Tetraodon margaritatus Rüppell, Atlas Reise Nördl. Afrika, p. 66, 1828.

Canthigaster margaritatus Smith, Fishes of Southern Africa, p. 421, pl. 94, fig. 1210, 1949.

Munro, Fishes of Ceylon, p. 279, pl. 54, fig. 814, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 50, 1959. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 368, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 160/496).

Tetrodon margaritatus Day, Fishes of India, p. 707, 1878 (in part).

Specimens studied: Agathi (3), 32 to 53 mm. Ameni (3), 45 to 77 mm. Bitra (2), 54 and 55 mm. Chetlat (8), 36 to 60 mm. Kadamat (1), 30 mm. Kalpeni (4), 56 to 73 mm. Kavarathi (1), 51 mm. Kiltan (2), 67 and 86 mm. Minicoy (2), 32 and 71 mm.

D. i, 8; A. i, 8; P. ii, 14-15.

Head 2.5-2.6 in standard length, 3.1-3.3 in total length. Depth of body 2.2-2.5 in standard length, 2.8-3.2 in total length. Eye 4.2-4.6 in head, 2.7-3.1 in snout and 1.5-1.7 in somewhat concave interorbital space. Nostrils with a low rim. Dorsal ridge somewhat well developed. Head and entire body covered with minute spines. Pectoral about twice diameter of eye. Caudal peduncle deeper than long. Colour: Bluish brown, lighter on sides and below. Interorbital space crossed by blue lines. Horizontal bluish lines on upper part of head and on back. Cheek, body and caudal fin covered with small bluish ocelli edged dark. A large black blue edged ocellus below base of dorsal fin. Pectoral, dorsal and anal yellowish.

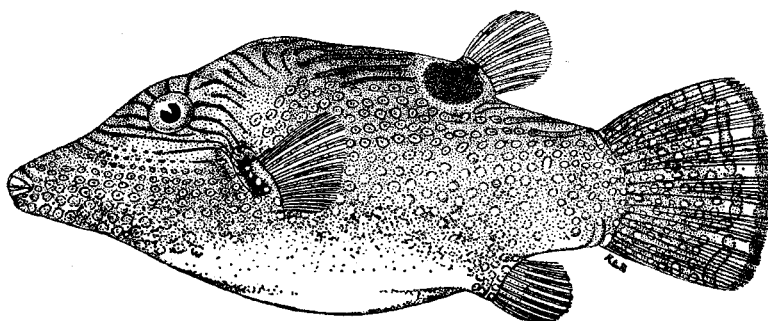


FIG. 590. *Canthigaster margaritatus* (Rüppell), 67 mm.

Local names: *Thundigu-koli* (Minicoy). *Chundu* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Mariana, Fiji, Phoenix, Society and Tuamotu Islands.

591. *Canthigaster bennetti* (Bleeker)

Tropidichthys Bennettii Bleeker, Nat. Tijds. Ned.-Ind., 6, p. 504, 1854.

Canthigaster bennetti de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 369, 1962. Smith and Smith, Fishes of Seychelles, p. 61, pl. 98, D, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 160/497).

Canthigaster sp. Jones and Kumaran, Indian J. Fish., 6, pp. 50 and 52, fig. 6, f, 1959.

Specimens studied: Ameni (1), 69 mm. Kadamat (2), 36 and 47 mm. Minicoy (8), 22 to 86 mm. Suheli (2), 58 and 61 mm.

D. i, 9; A. i, 8-9; P. ii, 13-14.

Head 2.6-2.9 in standard length, 3.2-3.6 in total length. Depth of body 2.6-2.7 in standard length, 3.2-3.3 in total length. Eye 4.0-4.7 in head, 2.4-2.8 in snout and 1.4-1.7 in concave interorbital space. Small spines on head and

body, less numerous on sides of body and back. Longest rays of pectoral 2.2-2.5 in head. Longest rays of dorsal and anal 2.3-2.7, and 3.0-3.4 respectively in head length. Caudal peduncle longer than deep. Colour: Greenish brown, whitish below with bluish black spots on lower half of head and body as far as the caudal peduncle. Spots on head intermingled with white patches. Four narrow blackish streaks on cheek with white border. Streaks across eye bluish black bordered with white. Dark reticulations on the back. Dark patch at base of dorsal with one or two black streaks. A bluish band ventrally along the median line of abdomen. Dorsal, anal and caudal pale whitish.

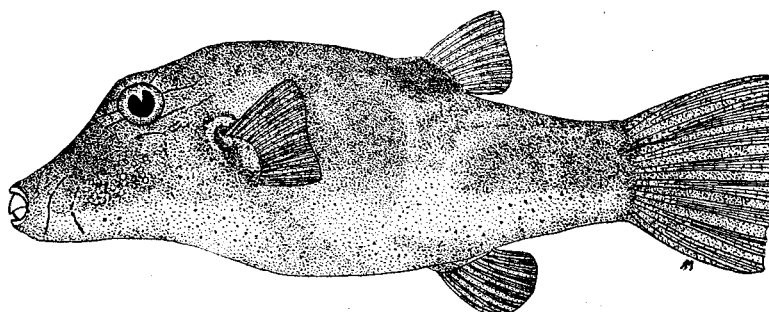


FIG. 591. *Canthigaster bennetti* (Bleeker), 78 mm.

Local names: *Thundigu-koli* (Minicoy). *Chundu* (other islands).

Distribution: East coast of Africa, Seychelles, Laccadives, Indonesia, Philippines and New Hebrides, Samoan, Caroline and Tuamotu Islands and Australia.

Family LAGOCEPHALIDAE

Rather elongate, back rounded. Dental plates in each jaw with a median suture. Nasal organ on each side a papilla with two nostrils. Two lateral lines, the lower often restricted to the chin. Head and body with small spines.

Brown above with whitish spots, lower sides dull white. Three dark cross bars on lower half of head *Sphoeroides hypselogeneion*

Bluish black above, dull white below. Four or five black spots on sides below level of pectoral *Lagocephalus lagocephalus*

592. *Sphoeroides hypselogeneion* (Bleeker)

Tetraodon hypselogeneion Bleeker, Nat. Tijds. Ned.-Ind., 3, p. 300, 1862.

Amblyrhynchotes hypselogenion Smith, Fishes of Southern Africa, p. 418, pl. 93, fig. 1199.

Munro, Fishes of Ceylon, p. 279, pl. 55, fig. 815, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959.

Sphaeroides hypselogeneion Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 31, 1969 (Cat. No. CMFRI-LA-F. 161/498).

Spheroides hypselogenion Regan, Trans. Linn. Soc. London, 1 (3), p. 252, 1908.

Sphaeroides hypselogeneion de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 388, 1962.

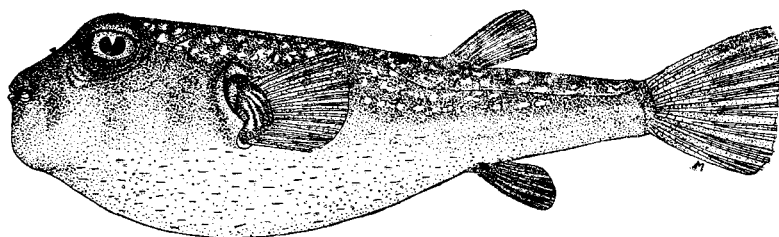


FIG. 592. *Sphaeroides hypselogeneion* (Bleeker), 63 mm.

Specimens studied: Androth (1), 49 mm. Bitra (1), 53 mm. Chetlat (4), 38 to 49 mm. Kalpeni (2), 63 and 86 mm. Kavarathi (1), 49 mm. Minicoy (6), 43 to 59 mm. Pitti (1), 35 mm. Suheli (1), 69 mm.

D. ii, 6-7; A. i, 6-7; P. ii, 12-13.

Head 2.6-2.9 in standard length, 3.3-3.6 in total length. Eye 3.6-4.5 in head, 1.4-1.8 in snout and about 1.8-2.0 in interorbital space. Chin prominent. Nasal organ an elevated papilla with two openings. Pectoral 2.2-2.5 in length of head. Longest dorsal rays 2.2-2.5 in head and longest anal rays 2.6-2.8 in head. Spines on sides of head and body, but not reaching dorsal and anal. Colour: Brown above with whitish spots, lower sides dull white, the two colours separated by a dark band from above gill opening to base of caudal. Three broad dark bands on sides of head. Fins pale white.

Local names: *Koli* (Minicoy), *Chundina-kunhi* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India, Ceylon, Philippines and Fiji, Samoan and Hawaiian Islands.

593. *Lagocephalus lagocephalus* (Linnaeus)

Tetrodon lagocephalus Linnaeus, Syst. Nat., ed. 10, p. 332, 1758.

Lagocephalus lagocephalus Smith, Fishes of Southern Africa, p. 417, pl. 94, fig. 1193, 1949. Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 306, fig. 26, 1964. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 161/499).

Specimens studied: Agathi (1), 214 mm. Minicoy (2), 195 and 350 mm.

D. i, 13; A. i, 12; P. i, 13.

Head 3.2-3.3 in standard length, 3.7-3.8 in total length. Depth of body 4.1-4.3 in standard length, 4.8-4.9 in total length. Eye 4.4-4.6 in head, 1.8-2.0 in snout and 1.8 in interorbital space. Body naked above and on sides, lower

sides from below snout upto vent with strong spines. Nostrils in pairs, flush with the surface. Dorsal and anal falcate. Pectoral 1.7-1.8 in head, longest dorsal and anal rays 2.0 and 2.2 respectively in head. Colour: Bluish black above, dull white on lower sides with 4 or 5 black spots on sides below pectoral. Fins dark; 4 lower rays of pectoral white.

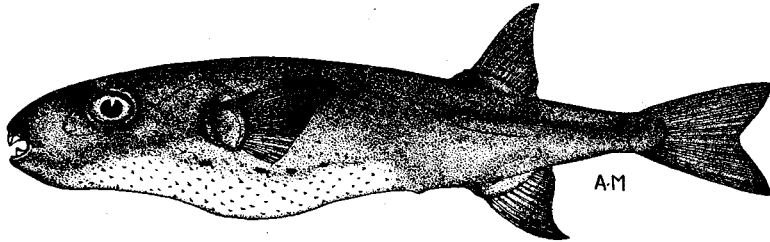


FIG. 593. *Lagocephalus lagocephalus* (Linnaeus), 214 mm. (after Jones and Kumaran)

Local names: *Digu-koli* (Minicoy). *Parava-chundu*, *Meen-chamanian* (other islands).

Distribution: Widespread in the Atlantic and Mediterranean; occasionally recorded from the east coast of South Africa, Mauritius and Laccadives in the Indian Ocean.

Family TETRAODONTIDAE

Short and robust; body naked or with small embedded spines. Teeth fused into two large plates in each jaw, with a median suture and forming a powerful beak. A single nostril on each side, sometimes with a fringed rim appearing like 2 fleshy flaps. Lateral line single or double. One dorsal fin with a few rays, similar and opposite to anal fin. Ventrals absent.

1. Body without spots; brownish to dark brown on back, lighter below; edges of caudal fin blackish *Tetraodon immaculatus*
 Head and back with white or black spots 2
2. Head, back and sides with white spots 3
 Head and body with black spots 4
3. Brown with small white spots over head, body and vertical fins and basal half of pectoral *Tetraodon meleagris*
 Brown above, lighter below with large white spots on upper half of head and body; belly with many narrow dark bands *Tetraodon hispidus*
4. Head and body with a few small scattered black spots; black rings around mouth; black blotch around vent; dorsal, anal and caudal dull white, rays light brownish *Tetraodon nigropunctatus*
 Upper part of head and body and caudal fin with numerous black spots; vent in a black blotch *Tetraodon stellatus*

594. *Tetraodon immaculatus* Bloch and Schneider

Tetraodon immaculatus Bloch and Schneider, Syst. Ichth., p. 507, 1801. Day, Fishes of India, p. 703, pl. 183, fig. 4, 1878.

Arothron immaculatus Smith, Fishes of Southern Africa, p. 420, pl. 93, fig. 1203, 1949. Munro, Fishes of Ceylon, p. 282, pl. 55, fig. 824, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959.

Tetraodon immaculatus de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 406, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 162/502).

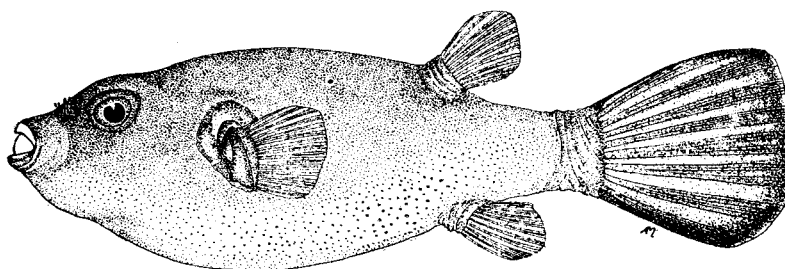


FIG. 594. *Tetraodon immaculatus* Bloch and Schneider, 85 mm.

Specimens studied: Kavarathi (1), 195 mm. Kiltan (1), 59 mm. Minicoy (4), 35 to 180 mm.

D. i, 8-9; A. i, 8-9; P. ii, 15-16.

Head 2.7-2.9 in standard length, 3.6-3.9 in total length. Eye 4.7-5.2 in head, 1.7-2.2 in snout and 2.3-2.7 in somewhat flat interorbital space. Nasal organs of two tentacles joined at the base. Head, body and tail excepting snout and posterior part of tail and base of anal covered with slender spines. Longest rays of dorsal and anal 2.4-2.8 in length of head. Pectoral 2.6-3.0 in head. Caudal peduncle longer than high. Colour: Brownish to dark brown above, lighter below. Upper and lower edges and margin of caudal blackish. Dorsal, anal and pectoral light yellowish.

Local names: *Koli* (Minicoy). *Chundu*, *Veerkunnon*, *Oothunnon* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Australia and Marshall, Gilbert, Fiji and Samoan Islands.

595. *Tetraodon meleagris* Lacépède

Tetraodon meleagris Lacépède, Hist. Nat. Poissons, 1, pp. 476 and 505, 1799. Regan, Trans. Linn. Soc. London, 12 (3), p. 253, 1908.

Arothron meleagris Smith and Smith, Fishes of Seychelles, p. 61, pl. 55, I, 1963.

Tetraodon meleagris Jones and Kumaran, J. Mar. biol. Ass. India, 6, p. 306, fig. 27, 1964.
Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 162/500).

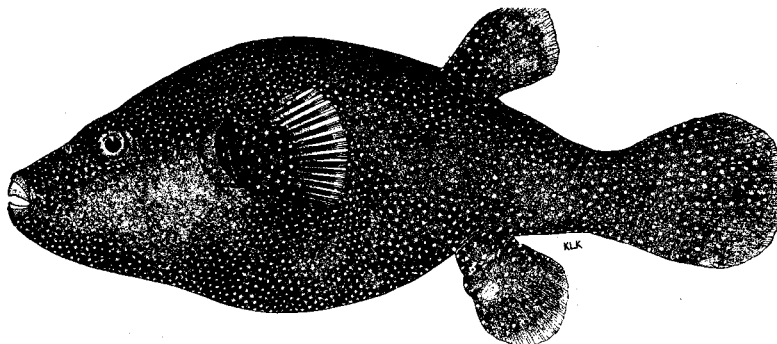


FIG. 595. *Tetraodon meleagris* Lacépède, 195 mm. (after Jones and Kumaran)

Specimens studied: Ameni (1), 110 mm. Kavarathi (7), 125 to 245 mm. Minicoy (4), 142 to 217 mm.

D. i, 11-12; A. i, 11-12; P. ii, 15-16.

Head 2.9-3.2 in standard length, 3.8-4.0 in total length. Eye 5.6-6.1 in head, 2.4-2.8 in snout and 3.4-3.7 in somewhat convex interorbital space. Nasal tentacle bifid. Pectoral 2.4-2.8 in head. Longest dorsal ray 2.3-2.5 in head and longest anal ray 2.4-2.8 in head. Colour: Dark brown with small white spots smaller than interspaces between them all over head, body, vertical fins and basal half of pectoral; margin of fins pale to light brownish.

Local names: *Kalu-koli* (Minicoy). *Karutha-chundu* (other islands).

Distribution: Aldabra, Seychelles, Laccadives, Maldives, Indonesia, Philippines and Hawaiian and Tuamotu Islands.

596. *Tetraodon hispidus* Linnaeus

Tetraodon hispidus Linnaeus, Syst. Nat., ed. 10, p. 333, 1758.
Arothron hispidus Smith, Fishes of Southern Africa, p. 420, pl. 93, fig. 1207, 1949. Munro, Fishes of Ceylon, p. 283, pl. 55, fig. 828, 1955. Balan, J. Bombay nat. Hist. Soc., 55, p. 303, 1958. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959.
Tetraodon hispidus de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 402, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 162/501).
Tetrodon hispidus Day, Fishes of India, p. 706, pl. 183, fig. 2, 1878.

Specimens studied: Agathi (3), 58 to 265 mm. Bangaram (1), 59 mm. Kadamat (1), 76 mm. Kavarathi (1), 195 mm. Minicoy (2), 39 and 83 mm.

D. i, 9-10; A. i, 9; P. ii, 16.

Head 2.4-2.6 in standard length, 3.0-3.3 in total length. Body short and flabby. Eye 4.2-4.6 in head, about 2.0 in snout and 2.4-3.0 in concave interorbital space. Longest dorsal rays 2.6-2.8 in head. Longest anal rays 3.0-3.2 in head. Pectoral 2.4-2.8 in head. Whole body except caudal peduncle usually spiny. Two nasal tentacles on each side. Colour: Brown above, lighter below with small bluish white spots on upper half of head and body and 4 or 5 broad irregular dark bars on sides from snout to above anal. A bluish white line around gill opening and behind base of pectoral. Caudal light brown, the margin a little darker. Other fins lighter, their bases light brown.

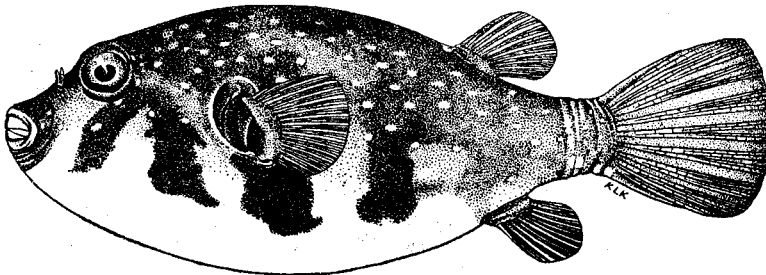


FIG. 596. *Tetraodon hispidus* Linnaeus, 83 mm.

Local names: *Gali-koli* (Minicoy). *Variyan-chundu*, *Veerkunnon*, *Oothunnon* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, coasts of India, Ceylon, Indonesia, Philippines, Australia and Marshall, New Hebrides, Samoan, Society and Hawaiian Islands.

597. *Tetraodon nigropunctatus* Bloch and Schneider

Tetraodon nigropunctatus Bloch and Schneider, Syst. Ichth., p. 507, 1801. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, **11**, p. 408, 1962. Jones, Bull. cent mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 162/503).

Arothron nigropunctatus Smith, Fishes of Southern Africa, p. 420, pl. 94, fig. 1204, 1949. Munro, Fishes of Ceylon, p. 283, pl. 55, fig. 825, 1955. Balan, J. Bombay nat. Hist. Soc., **55**, p. 303, 1958.

Tetrodon nigropunctatus Day, Fishes of India, p. 704, pl. 180, fig. 4, 1878. Regan, Trans. Linn. Soc. London, **12** (3), p. 253, 1908.

Specimens studied: Agathi (1), 176 mm. Kavarathi (4), 125 to 170 mm. Minicoy (12), 52 to 235 mm.

D. i, 9; A. i, 9-10; P. ii, 15-16.

Head 2.8-3.0 in standard length, 3.5-3.7 in total length. Eye 5.2-5.8 in head, 2.1-2.3 in snout and about 2.8-3.0 in nearly flat interorbital space. Head, body and tail except sides of mouth and posterior part of caudal peduncle with small whitish spines. Nasal organs of two tentacles on a short stem. Pectoral about 3.0-3.3 in head. Longest rays of dorsal and anal 3.4-3.8 in head. Colour: Brown, becoming lighter on the sides and beneath, with small scattered black spots on head, body and tail. Sides of mouth dark brown. A semilunar black blotch around the vent. Dorsal, anal and caudal dull white, rays light brownish. Some specimens pale yellowish with black spots on head and body and the hind third of pectoral brown.

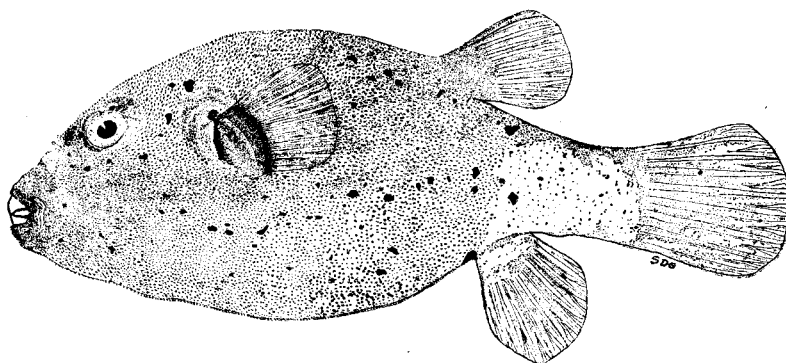


FIG. 597. *Tetraodon nigropunctatus* Bloch and Schneider, 170 mm.

Local names: *Reendu-koli* (Minicoy). *Manjal-chundu* (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines and Fiji, Samoan, Society and Hawaiian Islands.

598. *Tetraodon stellatus* Bloch and Schneider

Tetrodon lagocephalus var. *stellatus* Bloch and Schneider, Syst. Ichth. p. 503, 1801.

Arothron aerostaticus Smith, Fishes of Southern Africa, p. 420, pl. 94, fig. 1206, 1949.

Munro, Fishes of Ceylon, p. 283, pl. 55, fig. 827, 1955. Jones and Kumaran, Indian J. Fish., 6, p. 49, 1959.

Arothron stellatus Smith, Fishes of Southern Africa, p. 420, pl. 95, fig. 1205, 1949. Munro, Fishes of Ceylon, p. 293, pl. 55, fig. 826, 1955.

Tetraodon stellatus de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 399, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 162/504).

Tetrodon lineatus Day, Fishes of India, pl. 180, fig. 3, 1878.

Tetrodon stellatus Day, Fishes of India, p. 705, pl. 183, fig. 3, 1878. Regan, Trans. Linn. Soc. London, 12 (3), p. 253, 1908.

Specimens studied: Bangaram (1), 71 mm. Kavarathi (1), 138 mm. Minicoy (2), 65 and 90 mm. Suheli (1), 83 mm.

D. i, 10; A. i, 10 or ii, 9; P. ii, 17-18.

Head 2.4-2.7 in standard length, 3.0-3.2 in total length. Eye 4.7-5.8 in head, 2.1-2.8 in snout and 2.4-3.0 in almost flat interorbital space. Nasal organ bilobed. Head except lips and body covered with small spines. Longest rays of dorsal and anal 2.8-3.2 in head. Longest rays of pectoral 2.6-3.0 in head. Colour: Brownish above, dull white below. Upper part of head and body and caudal fin with small black spots. Vent in a black blotch. Lower sides with oblique black bands in small specimens, disappearing with age. Dorsal and anal pale or slightly darker. Pectoral dull yellowish with dark base.

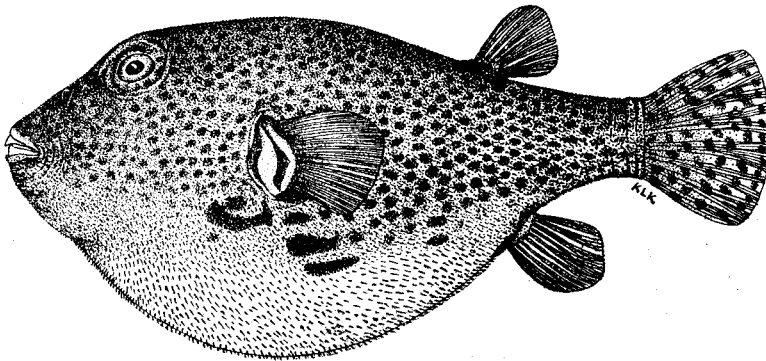


FIG. 598. *Tetraodon stellatus* Bloch and Schneider, 138 mm.

Local names: Sikki-koli (Minicoy). Pulli-chundu, Veerkunnon, Oothunnon (other islands).

Distribution: East coast of Africa, Red Sea, Laccadives, Maldives, coasts of India, Ceylon, Philippines, Australia and Fiji, Samoan, Society and Hawaiian Islands.

Order LOPHIIFORMES

Physoclistic. First dorsal spine when present on head transformed into an illicium. Illicium usually with fringes or with filaments. Ventrals when present jugular and with 6 rays. Ribs and epipleurals absent. Post-temporal simple, suturally united to skull. Gill openings usually restricted. Scales obsolete and skin often with fleshy flaps or excrescences.

Family ANTENNARIIDAE

Body slightly compressed. Mouth oblique. Gill opening restricted, usually just below pectoral base. Teeth small in bands on jaws, vomer, palatines and tongue. Skin rather rough, head and body sometimes with cutaneous excrescences. Dorsal with three spines, the first usually slender, movable and fringed at tip, the second and third sometimes enveloped in thick skin.

1. Skin smooth. Head, body and second and third dorsal spines with numerous cutaneous fringes *Histrio histrio*
Skin rough. No cutaneous fringes as above; small excrescences sometimes present 2
2. No distinct caudal peduncle. Dorsal and anal joined to base of caudal. End of second dorsal spine curved. A smooth pit posterior to second dorsal spine *Antennarius coccineus*
A distinct caudal peduncle present 3
3. Head and upper side of body with some rough excrescences. Head, body and fins with several light edged black ocelli *Antennarius leprosus*
No rough excrescences as above 4
4. No smooth pit behind second spine of dorsal. First dorsal spine longer than second and third. Uniform blackish; a large black blotch at base of posterior rays of dorsal and on anal; rays of pectoral and ventral with white tips *Antennarius chironectes*
A smooth pit behind second spine of dorsal. First dorsal spine as long as second spine. Reddish brown with irregular dark markings on sides and dark lines radiating from eye; a white edged black ocellus at base of 6th to 9th dorsal rays *Antennarius nummifer*

599. *Histrio histrio* (Linnaeus)

Lophius histrio Linnaeus, Syst. Nat., ed. 10, p. 237, 1758.

Antennarius marmoratus Day, Fishes of India, p. 272, 1878.

Histrio histrio Smith, Fishes of Southern Africa, p. 431, pl. 98, fig. 1243, 1949. Munro, Fishes of Ceylon, p. 288, pl. 56, fig. 837, 1955. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 197, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 168/505).

Specimen studied: Minicoy (1), 46 mm.

D. 1+1+1+12; A. 7; P. 10; V. 5.

Head 2.1 in standard length, 2.8 in total length. Depth of body 1.9 in standard length, about 2.6 in total length. Eye about 9.0 in head, 1.3 in snout and 1.6 in interorbital space. Lower jaw projecting beyond the upper. Skin smooth. Head, body, tail and second and third dorsal spines with numerous cutaneous fringes, those at the angle of mouth and on abdomen larger. First dorsal spine slender, about half length of second, tip bulbous with two small tentacles. Last two rays of dorsal forked. First two rays of anal simple, others forked. Rays of pectoral simple. Colour: Yellow with irregular blackish bands on head, body and fins.



FIG. 599. *Histrio histrio* (Linnaeus), 46 mm.

Local names: *Gali-kendi*, *Gouthere-mas* (Minicoy).

Distribution: Tropical and subtropical oceans and seas.

600. *Antennarius coccineus* (Lesson)

Chironectes coccineus Lesson, Voy. *Coquille*, Poissons, p. 143, pl. 16, fig. 1, 1830.

Antennarius coccineus Smith, Fishes of Southern Africa, p. 431, pl. 98, fig. 1238, 1949.

Regan, Trans. Linn. Soc. London, 12 (3), p. 250, 1908. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 203, 1962. Jones and Kumaran, J. Mar. biol. Ass. India, 8, p. 179, fig. 20, 1966. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 168/506).

Specimens studied: Bitra (1), 33 mm. Minicoy (1), 37 mm.

D. 1+1+1+12; A. 7; P. 10; V. 5.

Head 1.9 in standard length, 2.4 in total length. Depth of body 1.7 in standard length, 2.2 in total length. Eye about 6.7 in head, equal to snout and 1.5 in interorbital space. First dorsal spine slender, equal to curved second spine in length, with bulbous tip consisting of tentacles. A smooth pit behind second spine. Two posterior dorsal rays forked. First anal ray simple, others forked. Inner ray of ventral deeply forked. Dorsal and anal attached very close to base of caudal. Skin rough, covered with small denticles, those on upper part of head, on second and third dorsal spines and on first dorsal ray prominent. Cutaneous filaments present on sides of head and body. Colour: Pinkish with indistinct dark blotches above and behind pectoral and at origin of soft dorsal.

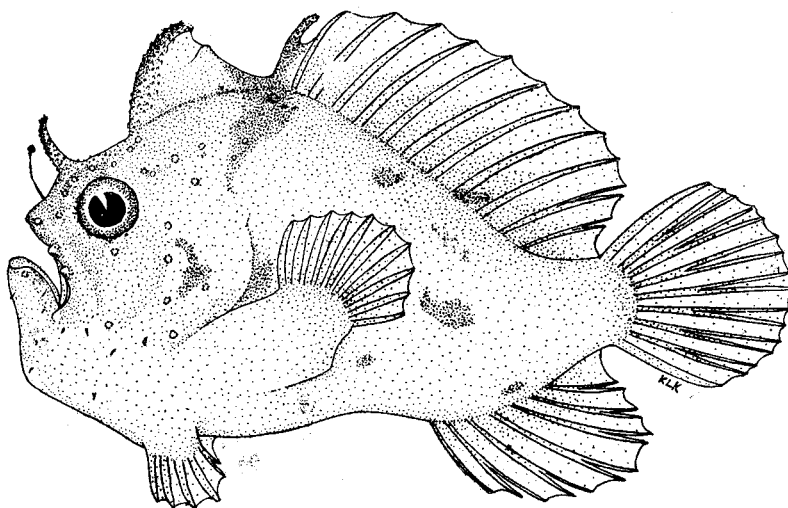


FIG. 600. *Antennarius coccineus* (Lesson), 37 mm. (after Jones and Kumaran)

Local names: *Gouthere-mas* (Minicoy). *Peychanpolotha-meen* (Bitra).

Distribution: Coast of Natal, Reunion, Red Sea, Laccadives, Maldives, Chagos Islands, Cocos Keeling Islands, Indonesia, Philippines, Australia and Marshall, Tonga and Samoan Islands.

601. *Antennarius leprosus* (Eydoux and Souleyet)

Chironectes leprosus Eydoux and Souleyet, Zool. Voy. *Bonite*, 1, p. 187, pl. 5, fig. 3, 1841.
Antennarius leprosus Munro, Fishes of Ceylon, p. 288, pl. 56, fig. 839, 1955. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 168/507).

Specimens studied: Kavarathi (1), 65 mm. Minicoy (1), 43 mm.

D. 1+1+1+12; A. 7; P. 10 (9); V.5.

Head 1.9-2.0 in standard length, 2.5-2.7 in total length. Depth of body 1.5-1.6 in standard length, 2.0 in total length. Eye 9.5-10.0 in head, 1.5-1.8 in snout and 2.4-3.0 in interorbital space. First dorsal spine slender, equal to third spine and terminating in a fringed lobe. Skin rather rough, covered with minute denticles. Head and upper side of back with some rough excrescences. Last two rays of dorsal forked. All anal rays forked. Fifth ventral ray forked. Right pectoral with 10 rays and left pectoral with 9 rays in one of the specimens. Colour: Orange, becoming brownish on preservation; head and sides marbled dusky. Head, body and fins with several light edged black ocelli, those at base of posterior dorsal and anal rays being prominent.

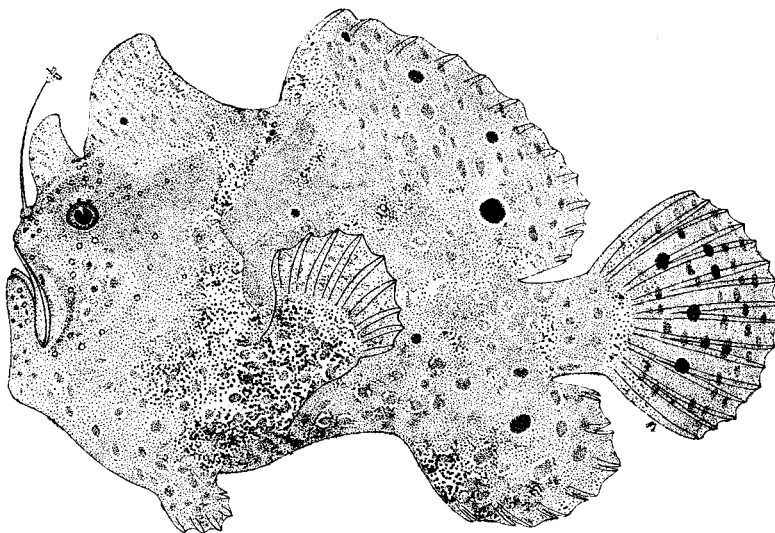


FIG. 601. *Antennarius leprosus* (Eydoux and Souleyet), 43 mm.

Local name: *Gouthere-mas* (Minicoy).

Distribution: Laccadives, Ceylon, Philippines and Hawaiian Islands.

602. *Antennarius chironectes* (Lacépède)

Lophius chironectes Lacépède, Hist. Nat. Poissons, 1, p. 321, pl. 14, fig. 2, 1798.

Antennarius chironectes de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 209, 1962. Smith and Smith, Fishes of Seychelles, p. 61, pl. 56, H, 1963. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 168/508).

Antennarius commersoni Munro, Fishes of Ceylon, p. 288, pl. 56, fig. 838, 1955.

Antennarius commersonii Smith, Fishes of Southern Africa, p. 430, pl. 98, fig. 1136, 1949.

Specimen studied: Kavarathi (1), 67 mm.

D. 1+1+1+12; A. 7; P. 10; V. 6.

Head 1.8 in standard length, 2.3 in total length. Depth of body 1.6 in standard length, about 2.1 in total length. Eye about 10.5 in head and about 2.0 in snout and 3.0 in interorbital space. First dorsal spine terminating in a single fringed lobe, equal to third spine. Second spine half as long as the third spine, with posterior membrane. Last two rays of dorsal forked. Anterior ray of anal simple, rest of the rays forked. Pectoral and pelvic rays simple. Skin rough. Colour: Nearly uniform blackish. A large black blotch at the base of posterior rays of dorsal and on anal. Tips of pectoral and ventral rays white.

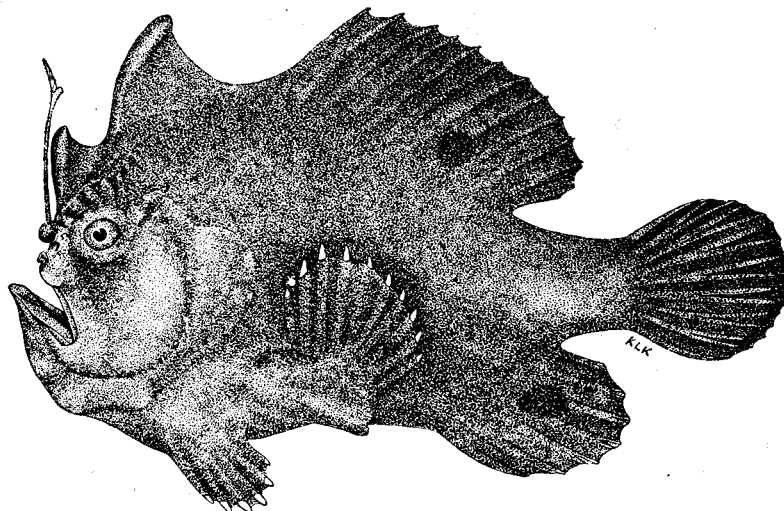


FIG. 602. *Antennarius chironectes* (Lacépède), 67 mm.

Local name: *Peychanpolotha-meen* (Kavarathi).

Distribution: Coast of Natal and islands in the Western Indian Ocean, Kavarathi in the Laccadives, coasts of India, Ceylon, Indonesia, Philippines and Society and Hawaiian Islands and Australia.

603. *Antennarius nummifer* (Cuvier)

Chironectes nummifer Cuvier, Mem. Mus. Hist. Nat. Paris, 3, p. 430, pl. 17, fig. 14, 1817.

Antennarius nummifer Day, Fishes of India, p. 272, pl. 59, fig. 2, 1878. Regan, in Gardiner, J. S., The fauna and geography of the Maldives and Laccadive Archipelagoes, 1, p. 275, 1903. Regan, Trans. Linn. Soc. London, 12 (3), p. 250, 1908. Munro, Fishes of Ceylon, p. 289, pl. 56, fig. 840, 1955. de Beaufort and Briggs, in Weber and de Beaufort, Fishes of the Indo-Australian Archipelago, 11, p. 217, 1962. Jones, Bull. cent. mar. Fish. Res. Inst., 8, p. 32, 1969 (Cat. No. CMFRI-LA-F. 168/509).

Specimen studied: Minicoy (1), 68 mm.

D. 1+1+1+12; A. 7; P. 13; V. 5.

Head 1.9 in standard length, 2.4 in total length. Depth of body 1.8 in standard length, 2.3 in total length. Eye about 12.0 in head, 2.2 in snout and 2.8 in interorbital space. Skin rough, covered with small spines. Cutaneous fringes on head and above pectoral. First dorsal spine as long as second spine and ending in a knob with small tentacles. Second spine half as long as third spine and separated from the latter by a smooth pit. Third spine attached to soft fin with a membrane. Two posterior rays of dorsal forked. First ray of anal simple, other rays forked. Pectoral rays unbranched. Last ventral ray deeply forked. Colour: Reddish brown with irregular dark markings on sides. Dark lines radiating from eye. A large black ocellus edged with white at base of 6th to 9th rays of dorsal, a light blotch with a dark centre below the black blotch, another similar one on caudal peduncle and small irregular blotches above pectoral. Fins with black spots.

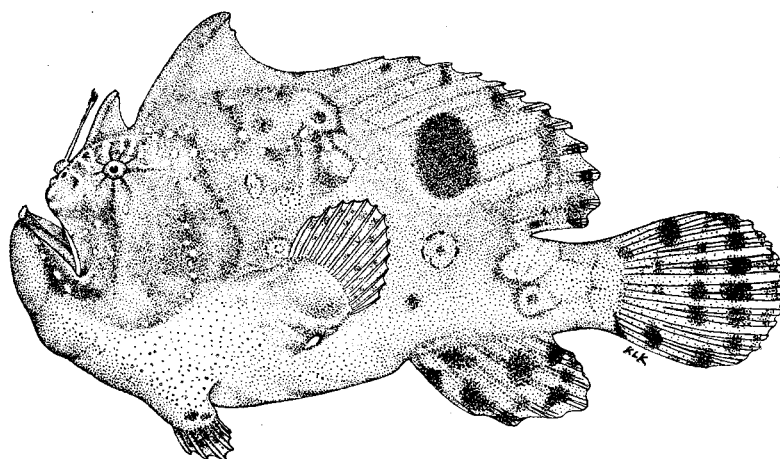


FIG. 603. *Antennarius nummifer* (Cuvier), 68 mm.

Local name: *Gouthere-mas* (Minicoy).

Distribution: Persian Gulf, Red Sea, Minicoy in the Laccadives, Maldives, coasts of India, Ceylon, Indonesia, Philippines, Japan and Samoan, Society and Hawaiian Islands.